Policy and Procedures for Tuberculosis Screening of Health-Care Workers

FRANCIS J. CURRY NATIONAL TUBERCULOSIS CENTER

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Preface

Institutional Consultation Services (ICS), a component of the Francis J. Curry National Tuberculosis Center, is funded by the Centers for Disease Control and Prevention (CDC) and the California Department of Health Services (CDHS). ICS staff have expertise and practical experience in infection control, occupational health, and mechanical engineering. Telephone and on-site consultations are provided to tuberculosis (TB) control staff of high-risk institutions, including health-care facilities, correctional facilities, and shelters.

Background

During 1997 and 1998, ICS received multiple requests for assistance with TB exposure control measures from clinics and acute care hospital emergency departments. ICS provided on-site consultations to 14 public health clinics, 3 community clinics, and 7 acute care hospital emergency departments. As part of the facility evaluation of TB exposure control measures at these sites, ICS staff reviewed the programs related to TB screening of health-care workers (HCWs).

Findings

Common problems identified regarding TB screening programs included the following:

- Two-step tuberculin skin test (TST) was not provided, when indicated, at hire
- HCWs with negative TST results were not screened for TB symptoms
- Policies and procedures for TB screening were not in writing
- Positive TSTs and TST conversions were incorrectly defined, resulting in misinterpretation of TST results
- Staff that apply and read TSTs were not designated and/or trained
- Follow-up of HCWs identified with TB infection or TB disease was not documented
- Periodic chest x-rays were unnecessarily required of TST-positive HCWs who had no symptoms of TB disease
- Lines of responsibility regarding TB screening and exposure follow-up were unclear

- Return-to-work procedures for HCWs with TB disease were not in place
- Incomplete education and training of facility staff regarding *Mycobacterium tuberculosis (M. tb)* transmission, required TB screening, exposure follow-up, and other issues were noted
- Counseling regarding the risk of exposure to *M. tb,* particularly for immunocompromised HCWs, was lacking

Facility Needs

Analysis of the findings indicated that facilities needed models for TB screening programs for HCWs that would provide:

- Assistance in developing written, practice-based, and facility-specific policies and procedures
- Guidance in implementation of comprehensive and coordinated programs
- Access to external resources

Introduction

This template for *Policy and Procedures for Tuberculosis Screening of Health-Care Workers* is designed to assist facilities in developing, implementing, and documenting an effective TB screening program for HCWs. The template is organized into two main parts:

Part 1 contains a complete model TB screening policy divided into 17 sub-sections outlining components of the TB screening program. Also included are abbreviations and definitions used in the policy and procedures.

Part 2 is the "how-to" section of the policy. Included are 14 detailed, step-by-step procedures and 9 corresponding flowcharts. Each of these procedures is designed to stand alone, if desired.

An appendix and a resource and reference section are also included.

The future tense is used throughout the template to indicate the facility's intention to implement the specific actions contained in the policy and procedures. The customized policy and procedures should accurately and completely reflect the facility's characteristics and the medical practice in reference to the TB screening program. If the facility chooses to modify the policy and procedures beyond the intended customization of the template, the facility should ensure that the additional changes reflect actual practice.

Efforts have been made to ensure that this policy includes applicable recommendations from the CDC and meets existing standards set by agencies such as the Occupational Safety and Health Administration (OSHA) and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). However, it may not address every issue of interest to any regulatory agency. Since regulations vary by county and state, and change periodically, facilities should review local, state, and federal regulations prior to finalizing the TB screening policy.

How to Use This Template

Use of this template requires a minimum of *Windows(R) 95* or *Mac OS 7.1* with *Microsoft Word™ 6.0* or *WordPerfect™ 8.0*.

This guideline was produced in a template format that can be customized by each facility to reflect facility characteristics, needs, and preferences. The template is issued in 3.5-inch disk and written form to provide broad access and ease of use.

Facility staff with access to a personal computer will be able to insert the disk, make selections, review and insert facility-specific information, and print out their own customized *Policy and Procedures for Tuberculosis Screening of Health-Care Workers*. Basic word processing skills are needed to select and delete text, add customized text, and work with tables.

Two types of files have been included on the disk: *TBScreen.rtf* and *TBScreen.pdf*.

TBScreen.rtf, which is in Rich Text Format *(rtf)*, is an editable file. Use this *rtf* file to customize your template. However, please be aware that the formatting and pagination of the *TBScreen.rtf* file may vary slightly, depending on your computer and your version of *Microsoft Word™ (MS Word)* or *WordPerfect™ (WP)*. See footnote for more detail.[1]

Because of these potential discrepancies, a Portable Document Format *(pdf)* file *(TBScreen.pdf)* is also included in the disk. This *pdf* file contains formatting and pagination that do not change from computer to computer. It is identical to the hard copy in the accompanying binder. However, it cannot be edited; it only serves as an example of how the template should look.

Instructions for Disk Use

This template is designed for use in computers with a minimum of *MS Word 6.0* or *WP 8.0*. Prior to inserting the disk, be sure that either word processing program is installed on the computer. Detailed instructions follow below.

[1] This template was created in *MS Word 97*. *WP* or earlier versions of *MS Word* may not have some features available in *MS Word 97,* resulting in different formatting. ICS recommends that versions earlier than *MS Word 6.0* or *WP 8.0* not be used because of potential formatting difficulties.

Also, each printer has a different "printable area," which determines the amount of text that can fit onto a page. For example, if your computer has a printer with a "printable area" that is a quarter-inch smaller than ICS's, the 2 or 3 lines that should have been at the end of the page will appear on the next page instead. Consequently, there will probably be pagination discrepancies between the document printed from the *TBScreen.rtf* file and the hard copy in the accompanying binder.

Microsoft Word™ or *Corel WordPerfect™*

1. Open *Microsoft Word™* or *Corel WordPerfect™* for Windows program.

2. Insert the *Policy and Procedures for Tuberculosis Screening of Health-Care Workers* disk in the computer's "A" drive.

3. To open the file:

   - Click on *Open File* icon, **or**

   - Select *File* from the toolbar, then select *Open* from the drop down menu

4. At *Look in* field, press arrow and select *3 1/2" Floppy (A:)* from the drop down menu.

5. If the *Files of Type* field displays *All Files (*.*)*, go to step 6. If not, click on the *Files of Type* arrow with the left mouse button to display the *All Files (*.*)* option and highlight it.

6. There should be 2 documents on the disk: *TBScreen.rtf* and *TBScreen.pdf.* Use *TBScreen.rtf* to customize your template. To open this file:

   - Highlight *TBScreen.rtf* and double-click on it with the left mouse button (or press *Enter* after highlighting the file)

   - You may be asked if you'd like to convert this file. Indicate *OK*, either by clicking on *OK* with the left mouse button or by pressing *Enter*

   - The converted document will open and you are ready to begin customizing it for your clinic

   Note: *Due to the formatting and pagination issues described earlier, a pdf file (TBScreen.pdf) is also included on your disk.*

   To open a pdf file, you must have Adobe Acrobat Reader™ installed on your computer. If this is the case, simply highlight and double-click on this file with the left mouse button (or press Enter after highlighting the file).

   If you do not have Adobe Acrobat Reader™ on your computer, you can obtain a free copy from Adobe's Web site:
   http://www.adobe.com/prodindex/acrobat/readstep.html
   Follow instructions for installation.

   To obtain technical support for Adobe Acrobat Reader,™ please call Adobe at: (206) 628-2746 (Windows) or (206) 628-2745 (Macintosh) (there is a fee for this call), or consult the following Web address:
   http://www.adobe.com/supportservice/custsupport/database.html

Instructions for Template Use

1. Be sure to make a copy of the original Rich Text Format document, *TBScreen.rtf,* **before** you make any changes to the document.

   To make a working copy:

   - Select *File* from the toolbar. Select *Save As* from the drop down menu
   - The cursor will be flashing in the *File Name* field. Backspace until *TBScreen* is erased. Type in new file name, e.g., *Curry TBScreen*
   - Click on *Save* or press the *Enter* key. You now have two Rich Text Format *(rtf)* documents on the disk: the original *TBScreen.rtf* and the copy you will work on

   If the original *TBScreen.rtf* is accidentally erased, it can be downloaded from the Francis J. Curry National Tuberculosis Center Web site: http://www.nationaltbcenter.edu/ics.html

2. ***[Boldface italicized text inside brackets]*** throughout the document indicates an action to be taken, a decision to be made, or a need to customize. As you continue through the document, you may be inserting names of individuals, committees, and departments who will be accountable for areas of the policy; developing lists and inserting them into the text; and making choices between options.

3. Delete the instructions contained within the bold italicized brackets after your substitutions are made.

   Occasionally, your substitutions may appear as bold italicized text. To undo this unwanted formatting, simply highlight the text, press the *I* button, and then the *B* button on the toolbar (or highlight the text, press *Ctrl+I*, then *Ctrl+B)*.

   Continue through the document until all opportunities for customization have been addressed.

4. ICS recommends that desired changes be written in by hand before editing electronically. If you prefer not to write on the hard copy in the binder, either make a copy of it or print the *TBScreen.pdf* file.

   ICS recommends printing from the *pdf* file because it is identical to the hard copy in the binder. The *rtf* file *(TBScreen.rtf)* may be different from the hard copy in the binder because of the formatting and pagination issues discussed earlier.

   To print *TBScreen.pdf,* make sure the file is open, and choose one of the following methods:

   - Select the picture of the printer on the toolbar

- Select *File* from the toolbar, *Print* from the drop down menu, and *OK*
- Press *Ctrl+P*

If the file is closed, you can drag the file icon to a printer.

5. In the *TBScreen.rtf* document, page breaks have been manually inserted *only* at the end of major sections and tables, if appropriate.

   After you have finished customizing your document, you will probably want to insert additional manual page breaks for easier readability. For example, you may wish to insert a page break before headings at the bottom of the page if the corresponding text appears on the next page, or before tables that take up 2 pages if they can fit onto 1 page.

   To insert a page break, position the cursor where you would like to add the break and press *Ctrl+Enter,* or:

   - *MS Word:* Select *Insert* from the toolbar. Select *Break* from the drop down menu. Choose the *Page Break* option. Click on *OK* with the left mouse button
   - *WP:* Select *Insert* from the toolbar. Select *New Page* from the drop down menu

6. As you customize the *TBScreen.rtf* file, you may need to delete manual page breaks. ICS recommends that the *Normal View* be used when deleting manual page breaks because this view explicitly displays each page break.

   To use the *Normal View* feature, select *View* from the toolbar, then *Normal View* from the drop down menu.

   To delete manual page breaks, place the cursor at dotted lines accompanied by the words “Page Break” and press delete.

7. There are two tables of contents in this document. The first table of contents contains page numbers to facilitate navigation while customizing the template. The second table of contents (located after the “[Facility Name]” title page) has no page numbers. After customizing the document, please insert the final page numbers on this page.

8. The illustrations from Procedures 3 and 4, and the flowcharts are not included in the electronic file because of the disk’s limited space. These are included in the binder, on the *pdf* file (flowcharts only), and on the Francis J. Curry National Tuberculosis Center Web site:
   http://www.nationaltbcenter.edu/ics.html

9. Save your customized *Policy and Procedures* by selecting *File* from the toolbar and *Save* from the drop down menu, or pressing *Ctrl+S.*

10. Print your customized *Policy and Procedures* and, if desired, place in the binder behind the *Policy and Procedures for TB Screening of Health-Care Workers: Customized* tab.

Please note that these files are disseminated on high density disks. Some older computers may read only double density disks. If your computer cannot read the disk or if it is difficult to open these files, technical support is available:

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tbcenter@nationaltbcenter.edu

[Facility Name]

Policy and Procedures for Tuberculosis Screening of Health-Care Workers

[Insert date completed/modified here]

Developed from a template provided by the

INSTITUTIONAL CONSULTATION SERVICES

FRANCIS J. CURRY NATIONAL TUBERCULOSIS CENTER

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TB Screening Flowcharts *[ ]*

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TB Screening Flowchart 1: Pre-Placement/Initial: Last Tuberculin Skin Test Documented Negative < 12 Months Ago *[ ]*

TB Screening Flowchart 2: Pre-Placement/Initial Schedule A: No Prior Tuberculin Skin Test (TST), No Documented TST, or Documented Negative TST 12 or More Months Ago ***[ ]***

TB Screening Flowchart 3: Pre-Placement/Initial Schedule B: No Prior Tuberculin Skin Test (TST), No Documented TST, or Documented Negative TST 12 or More Months Ago ***[ ]***

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Appendix ***[ ]***

Appendix A: Guidelines and Regulations ***[ ]***

Resources and References ***[ ]***

Abbreviations

Organizations

Cal/OSHA	California Division of Occupational Safety and Health (California OSHA)
CDC	Centers for Disease Control and Prevention
ICS	Institutional Consultation Services
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
OSHA	Occupational Safety and Health Administration (federal)

Terms

AFB	acid-fast bacilli
BCG	Bacillus of Calmette-Guerin
CXR	chest x-ray
HCW	health-care worker
HIV	human immunodeficiency virus
IV	intravenous
mm	millimeters
MMWR	Morbidity and Mortality Weekly Report
M. tb	*Mycobacterium tuberculosis*
NAAT	nucleic acid amplification test
PPD	purified protein derivative
TB	tuberculosis
TST	tuberculin skin test
TU	tuberculin units

Note on the use of *M. tb* and TB in this document:

This document generally employs the commonly used term “TB infection” rather than the more technically correct “infection with *Mycobacterium tuberculosis (M. tb).*”

In order to be consistent with OSHA, the terms “TB exposure control measures” and “TB exposure control plan” are used rather than “*M. tb* exposure control measures” or “*M. tb* exposure control plan.” However, when referring to health-care worker exposure, the term “exposure to *M. tb*” is used throughout.

Definitions

Anergy: Inability to react to antigens because of immunosuppression, even if the person is infected with the organisms tested.

Bacillus of Calmette-Guerin (BCG) vaccine: A TB vaccine used in many parts of the world. BCG is rarely used in the United States.

Cluster of tuberculin skin test (TST) conversions: Two or more TST conversions occurring within a three-month period among HCWs in a specific area or occupational group, and epidemiologic evidence suggesting occupational (nosocomial) transmission.

Conversion: Change in tuberculin skin test results of at least 10 mm from less than 10 mm to 10 mm or greater within a two-year period.

False-negative tuberculin skin test (TST): TST results that incorrectly identify an absence of TB infection when TB infection is present.

False-positive tuberculin skin test (TST): TST results that incorrectly identify TB infection when TB infection is not present.

Person-to-person transmission: Transmission between people as evidenced by identical DNA fingerprint (RFLP) or drug-resistance patterns in *M. tb* isolates from two or more epidemiologically-linked TB cases. In a health-care facility, this finding suggests occupational (nosocomial) transmission.

Purified protein derivative (PPD): Purified tuberculin preparation used in Mantoux tuberculin skin test.

TB infection: A condition in which living tubercle bacilli are present in the body without clinical disease. TB infection without TB disease cannot be transmitted. Persons with TB infection have no symptoms of TB disease and generally have a positive tuberculin skin test.

TB disease (i.e., active TB disease): A condition in which living tubercle bacilli are present in the body and the disease is clinically active. Bacilli from TB disease of the lungs or larynx can be transmitted when a person with the disease coughs, sings, laughs, speaks, or breathes. Persons with TB disease have symptoms and generally have a positive tuberculin skin test.

Two-step tuberculin skin testing (TST): A procedure used to establish an accurate baseline for periodic TST programs. Two-step testing reduces the likelihood of mistaking a boosted TST reaction for new TB infection. In health-care facilities, the two-step TST is conducted at the time of hire.

Policy for Tuberculosis Screening of Health-Care Workers

I. General Policy

A. _____ ***[Insert facility name]*** will provide screening for tuberculosis (TB) to health-care workers (HCWs) as part of a comprehensive TB exposure control program.

B. The purpose of the TB screening program is to:

1. Identify HCWs with TB disease to prevent *Mycobacterium tuberculosis (M. tb)* transmission to HCWs, patients, and visitors, **and**

2. Identify TB infection in HCWs to prevent progression to TB disease, **and**

3. Evaluate the effectiveness of TB exposure control measures in order to identify the need for corrective action, **and**

4. Comply with federal, state, and local regulations and guidelines.

C. Screening will be provided to all paid and unpaid HCWs with the potential for exposure to *M. tb*, including, but not limited to:

- Physicians, nurses, nursing assistants/aides
- Physical, occupational, and respiratory therapists
- Dental workers
- Technicians, including radiology, EKG, and phlebotomy
- Workers in laboratories and morgues
- Counselors and interviewers
- Emergency medical service personnel
- Students and residents
- Part-time personnel
- Temporary/contract staff not employed by _____ ***[Insert facility name]***

- Persons not involved directly in patient care, but who are potentially at risk for occupational exposure to *M. tb:*

  - Dietary workers
  - Housekeeping staff
  - Maintenance workers and engineers
  - Clerical staff
  - Janitorial staff
  - Volunteer workers

[Delete from or add to the list in I.C. to create a list of HCWs appropriate to the facility.]

II. Compliance with Guidelines and Regulations

A. _____ ***[Insert facility name]*** will comply with established federal, state, and local guidelines and regulations pertaining to TB screening of HCWs, including:

[Use Appendix A as a starting point to determine which federal, state, or local guidelines and regulations are applicable to the facility's TB screening program of HCWs. Insert list of applicable guidelines and regulations here.]

III. Authority and Responsibility for Policy and Procedures

A. The following individual(s)/committee(s)/department(s) will have the authority and/or responsibility for all or parts of the policy and procedures: ***[Insert appropriate individual/committee/department in spaces below.]***

1. _____has/have the authority to ensure full compliance with the policy and procedures.
2. _____has/have the authority to ensure compliance of physicians and medical groups with the policy and procedures.
3. _____has/have the authority and responsibility to periodically review and revise the policy and procedures.
4. _____has/have the responsibility of medical direction of and active support for the TB screening program.
5. _____has/have the responsibility for performing *M. tb* risk assessments annually.

6. _____has/have the authority to provide TB screening programs.

7. _____has/have the responsibility for implementing the TB screening programs.

8. _____has/have the responsibility to identify and evaluate health-care workers who are newly infected as a result of exposure to a person with TB disease.

9. _____has/have the responsibility for facility-wide TB education and documentation of education.

B. All health-care workers will comply with the *Policy and Procedures for Tuberculosis Screening of Health-Care Workers* as a condition of their employment, including obtaining required tuberculin skin tests (TSTs) and follow-up, as appropriate; attending educational sessions; and using safe work practices to prevent exposure to *M. tb*.

IV. Definitions

Definitions of the terminology used in the policy and procedures precede the Policy.

V. Transmission and Pathogenesis

A. TB is a communicable disease caused by *M. tb*.

B. *M. tb* is spread from person-to-person by airborne particles called droplet nuclei that are 1-5 microns in diameter.

1. Droplet nuclei containing *M. tb* are produced when a person with TB disease of the lungs or larynx coughs, sneezes, speaks, sings, or breathes.

2. Droplet nuclei remain airborne indefinitely or until removed by natural or mechanical ventilation.

C. Transmission may occur when a person inhales air containing the droplet nuclei. The risk of transmission depends primarily on:

1. Degree of infectiousness of the person with TB disease (source)

2. Duration of exposure

3. Characteristics of the environment in which exposure occurred

D. TB infection is caused by the multiplication of *M. tb* in the alveoli of the lung.

E. Persons with TB infection have no symptoms, have a negative chest x-ray, and are not contagious. Such persons usually have a positive reaction to the purified protein derivative (PPD) tuberculin skin test.

F. TB infection may progress to TB disease.

1. Two to ten weeks after the initial TB infection, an immunologic response usually prevents the development of TB disease.

2. Approximately five percent of infected persons will develop TB disease within the first two years after infection.

3. Another five percent will develop TB disease later in life.

G. Certain medical conditions increase the risk of progression from TB infection to TB disease. For example:

1. For persons with human immunodeficiency virus (HIV) infection, the risk may be more than a hundred times greater than for immunocompetent persons.

2. For persons with diabetes, the risk may be approximately three times greater.

(See *Procedure 1* for a list of medical conditions that increase the risk of progression from TB infection to TB disease.)

VI. Epidemiology of Tuberculosis in the U.S.

A. In the mid-1980s, TB re-emerged as a serious national problem.

1. From 1985 to 1992, the number of new TB cases increased by 14 percent.

2. Five major factors contributed to this resurgence:

a. Increased TB in the HIV-infected population

b. Increased immigration from countries where TB is common

c. Transmission of *M. tb* in congregate settings such as health-care facilities, correctional facilities, and shelters

d. Deterioration of the public health infrastructure

e. Rise in multidrug-resistant TB

B. With the strengthening of TB control programs, the overall number of new cases of TB decreased between 1993 and 1997.

C. TB continues to be a health issue for HCWs.

1. In recent years, more than 500 cases of TB disease in HCWs have been reported to the CDC, representing just over two percent of U.S. cases annually.

2. HCWs who have contact with TB patients, without the benefit of appropriate control measures, continue to be at significant risk of TB infection and TB disease.

VII. Tuberculosis Screening Program

A. Risk assessment and screening frequency

1. The classifications of occupational risk levels as delineated by the CDC will be used to evaluate risk of exposure to *M. tb*.

2. Risk assessment categories with TB screening frequencies for the facility as a whole, or for each area, occupational group, or job title of HCWs exposed to *M. tb* in the facility are located at the end of *Procedure 2.*

[Review Procedure 2. Insert information in the table titled, Risk Level and Screening Frequency for HCWs by Area, Occupational Group, or Job Title, located at the end of Procedure 2.]

3. Screening will be staggered by_____ ***[Choose "date of hire" or "date of birth" and insert here]*** in order to:

a. Identify conversions or clusters as soon as possible so that preventive measures can be re-evaluated and/or instituted, **and**

b. Identify unknown *M. tb* exposure sources so that other contacts may be identified and evaluated and preventive measures instituted

B. Elements of TB screening

1. TB screening will include all or some of the following, as medically indicated, for the individual HCW:

a. Medical history

b. TB symptom review

c. Mantoux TST

d. Physical assessment

e. Chest x-ray

f. Other tests, as appropriate

C. Categories of TB screening and time frames for compliance

1. The following categories of and time frames for TB screening will be provided to HCWs:

a. Pre-placement screening

1) This screening will be provided upon hire to determine the baseline TB status of all HCWs and volunteers with potential exposure to aerosolized *M. tb* and will include two-step TSTs, as appropriate.

a) The two-step TST procedure will be performed using Schedule ____ in *Procedure 9.*

[See Procedure 9, and choose Schedule A or Schedule B. Insert either A or B in space above.]

2) The baseline TST and/or TB symptom questionnaire will be completed by each HCW prior to beginning work.

a) HCWs receiving two-step TSTs may be cleared to work after the first TST result has been read as negative and the TB symptom questionnaire reports no symptoms of TB disease.

(See *Procedures 7a, 7b, 8, 9, and 13*; and *Flowcharts 1, 2, 3, 4, and 5.)*

b) HCWs receiving two-step TSTs will have 14 days to complete TST screening.

c) If follow-up (e.g., chest x-ray, medical evaluation) is required after the baseline TST and/or TB symptom questionnaire, the HCW's clearance to begin work will be delayed until TB screening follow-up has been completed.

b. Periodic screening

1) This screening will identify HCWs who have:

a) TB disease, **or**

b) New TB infection, without a known *M. tb* exposure, and who are, therefore, at increased risk of progression to TB disease and candidates for treatment of TB infection.

2) This screening also assists in determining the incidence of occupational transmission of *M. tb* from patient to HCW and between HCWs without a previously identified TB source.

3) HCWs will be notified by _____ ***[Insert individual, job title, or department]*** that TB screening is due. They will have 30 days from the date of notification to complete TB screening.

(See *Procedures 8, 10a, 10b, 10c, and 13,* and *Flowcharts 5, 6, 7.)*

c. Post-exposure screening

1) This screening will be utilized to identify HCWs with new TB infection and TB disease associated with an occupational exposure to a documented, known TB source.

2) HCWs will be notified by_____ ***[Insert individual, job title, or department]*** that they must participate in post-exposure follow-up and that they have 1 week to complete post-exposure baseline TB screening.

3) HCWs will be notified by _____ ***[Insert individual, job title, or department]*** that they must obtain a second TST within 1 week of notification to complete post-exposure follow-up.

(See *Procedures 8, 10b, 10c, 11, and 13*; and *Flowcharts 5, 8 and 9.)*

(See the last page of *Procedure 11* for a table of additional activities and responsibilities associated with HCW post-exposure follow-up.)

D. Origins of TST conversions

1. Periodic and post-exposure screening will also include an assessment of occupational vs. community origins of TST conversions and TB disease identified in HCWs.

2. Unless an HCW has been exposed to TB disease from an identified close contact at home or at another institution, during travel outside the United States to areas with a high prevalence of TB disease, or any other obvious exposure, it will be presumed that the TST conversion is occupationally-acquired.

E. HCW notification of TST results

1. HCWs will be notified of all TST results, medical conditions that may cause TST results to be negative even when TB infection is present, and the increased risk of TB disease associated with these conditions if TB infection is present (see *Procedure 12)*.

VIII. Tuberculin Skin Testing

A. Mantoux tuberculin skin test

1. The Mantoux tuberculin skin test will be the screening method used to determine TB infection in HCWs. All HCWs who do not have a documented history of a positive TST result will be screened by this method. Two-step TSTs will also utilize this method.

2. Application of the Mantoux TST will be done according to *Procedure 3.*

3. Reading of the Mantoux TST will be done according to *Procedure 4*.

4. TSTs will be applied and read by designated and trained staff.

5. Training will include, but is not limited to:

   a. How to apply a TST

   b. How to read a TST

   c. How to interpret a TST result

   d. Identification of false reactions

   e. Supervised training in application of TSTs

6. If necessary, a limited number of staff will be trained to read negative TSTs with 0 mm induration only. These TST readers will refer all other TSTs to fully trained staff to be read.

7. In accordance with CDC and OSHA directives, HCWs will not self-read TSTs.

B. Interpretation of TST results

1. Interpretation of TST results will be made according to _____.

   [See Procedure 5 for the CDC's recommendations regarding TST interpretation.

   If local recommendations for TST interpretation differ from (and are more appropriate than) the CDC's, use local recommendations instead. Procedure 5 should then be altered to contain local rather than CDC recommendations.

   In the blank line above, insert either CDC or local organization, depending on the recommendations used.]

C. Anergy testing

1. Since problems of standardization, reproducibility, and interpretation exist in anergy testing, this testing will not be performed as part of the TB screening program.

D. Pregnancy

1. Since pregnancy is not a contraindication to TB skin testing, pregnant women will participate in the TB screening program. Pregnant women with questions about TB screening during pregnancy may be referred to their primary care providers or obstetricians.

IX. Education and Training of HCWs

A. All HCWs, including physicians, will receive mandatory TB education and training that is specific to their area, occupational group, and job title, and that varies according to the HCW's work responsibilities and risk level for *M. tb* exposure.

B. Training will be conducted:

1. Prior to initial assignment

2. At least annually thereafter

3. As needed, when an HCW transfers from an area with no *M. tb* exposure into an area, occupational group, or job title that places the individual at risk of exposure to *M. tb*.

C. The education and training program will include, but is not limited to, the following:

1. Basic concepts of *M. tb* transmission, pathogenesis, and diagnosis

2. Difference between TB infection and TB disease

3. Signs and symptoms of TB disease and whom to contact if symptomatic

4. Medical conditions that increase the risk of progression from TB infection to TB disease

5. Possibility of re-infection with *M. tb*

6. Potential for occupational exposure to patients with TB disease

7. Infection control practices that reduce the risk for transmission of *M. tb*

8. Purpose of TST and the significance of a positive TST result

9. Treatment of TB infection and potential side effects of medications

10. Need for prompt medical evaluation, if a TST conversion occurs or the HCW develops symptoms suggestive of TB disease

11. Effectiveness of drug therapy for TB disease

12. The necessity of the HCW to notify _____ ***[Insert individual, job title, or department]*** if diagnosed with TB disease

13. Risk of TB in immunocompromised persons

14. Facility policy for voluntary reassignment of immunocompromised HCWs

15. Importance of participating in the TB screening program and consequences of non-participation

16. Use and limitations of methods to prevent *M. tb* exposure

X. Counseling of HCWs Regarding *M. tb* Risk

A. At the time of hire:

1. HCWs will be counseled regarding the risk of *M. tb* exposure, including the potential for a false-negative TST.

2. Since an increased risk for rapid progression from TB infection to TB disease exists for persons who are HIV-infected or severely immunocompromised, all HCWs will be asked if they have a medical condition or are receiving medical treatment that may lead to significant immunosuppression.

3. These HCWs will be encouraged to work in areas that minimize risk of *M. tb* exposure and to request reasonable accommodation, in accordance with the Americans with Disabilities Act of 1990 (ADA), to work in positions with less risk.

B. During the course of employment:

1. HCWs who self-identify as immunocompromised will be encouraged to work in a job setting that minimizes the risk of exposure to *M. tb*.

2. Immunocompromised HCWs who request job reassignment from an area with significant *M. tb* exposure potential to an area/position with minimal exposure potential will be given reasonable accommodation for transfer to an alternative job in accordance with the ADA.

XI. Workers' Compensation

A. The facility will delineate who is covered under Workers' Compensation (e.g., HCWs, volunteers, residents, and students) and which medical and lost-time benefits are provided, if appropriate.

B. Medical records of HCWs being treated under Workers' Compensation will be maintained as confidentially as the law permits.

***Note**: Workers' Compensation laws vary from state to state regarding lost-time and medical treatment coverage for occupationally-acquired exposure and subsequent illnesses, such as TB infection and TB disease.*

XII. Contract Personnel

[Insert individual, job title, or department in blank spaces below.]

A. _____ will ensure that all contract employees are informed of the risk of exposure to *M. tb* in the area to which they are assigned.

B. Although contract employees are not directly employed by this facility, they will comply with this policy as follows:

1. _____ will provide all contractors with a copy of this policy, which is to be followed by all employees assigned to this facility. It will be the responsibility of the contractor to ensure that its employees understand and comply with this policy. Contract employees will receive TSTs according to the risk area in which they work, if they are routinely assigned to a particular area(s).

   [Consider offering TB screening services to contractors as part of their contract.]

2. Contractors will provide a list of all regularly-scheduled employees and will provide documentation of TST results for each employee or will provide access to these results, as required by law.

3. _____ will notify contractors of any potential *M. tb* exposures to their employees. The contractors will ensure post-exposure follow-up for the exposed employee(s). Any employee with TB disease will return to work only after complying with the criteria in *Procedure 13*.

4. Contractors will notify _____ of any employee in their hire who is diagnosed with TB disease and who has worked at this facility.

5. If appropriate, post-exposure follow-up of HCWs and patients will be conducted.

XIII. Physicians

Note: *Support of both physicians and administration is necessary to achieve physician compliance with TB screening programs and to ensure physician participation in these programs as part of the medical bylaws.*

[Insert individual, job title, or department in blank spaces below.]

A. _____ will ensure that all physicians and physician groups are informed of the risk of exposure to *M. tb* at their place of work.

B. Although physicians and physician groups may not be directly employed by this facility, all physicians will comply with this policy as follows:

1. _____ will inform all physicians and physician groups about this policy and will provide a copy upon request.

2. Physicians will receive TSTs according to the risk areas in which they work, if they are routinely assigned to a specific area(s).

3. _____ will notify all physicians and physician groups of any exposure to *M. tb*. Physicians will comply with post-exposure follow-up.

4. Physicians and physician groups will notify _____ of any physician who is diagnosed with TB disease. Criteria for return to work in *Procedure 13* will be met. If appropriate, post-exposure follow-up of HCWs and patients exposed to this case will be initiated.

5. Medical information obtained from physicians during TB screening is confidential and will be placed in a locked file in the same location as other HCW TB screening data. This will facilitate inclusion of physicians in aggregate data analysis of the TB screening program.

XIV. Volunteers

[Decisions should be made regarding who provides TSTs and, if indicated, chest x-rays (the facility or volunteers); who will conduct follow-up testing and screening; and who will pay for testing/follow-up (the facility or volunteers).]

A. Volunteers will be included in the TB screening program and will be screened with a TST and/or TB screening questionnaire at the time that their volunteer work commences. The screening frequency will be the same as for the HCWs working in the same area.

B. Minors who volunteer must obtain parental permission for TB screening.

XV. Compliance with the TB Screening Program

A. Compliance with TB screening as described in VII.C. above and *Procedures 7a, 8, 9, 10a, 11, and 13* is mandatory for all HCWs and volunteers.

B. HCWs who fail to comply with the requirements of TB screening will be notified in writing. Further non-compliance will result in disciplinary action up to, and including, removal from the work schedule until compliance is achieved.

C. Contractors who do not provide documentation of TB screening or access to this information will not be entitled to schedule any HCW to work in this facility until the requirement is met.

D. Compliance with TB screening as described in VII.C. above is mandatory for physicians and physician groups.

E. Physicians and physician groups that fail to comply with TB screening will have the renewal of their medical privileges delayed until this requirement is met.

XVI. Confidentiality of Medical Records

A. Medical information obtained from HCWs during TB screening is confidential and will be placed in locked files separate from the HCWs' personnel records. (If computerized, access to information in the database will be protected and limited to designated staff.)

B. Names of persons (including patients) diagnosed with TB disease (who may be the source of *M. tb* exposure to HCWs, volunteers, and physicians) will be kept confidential.

C. Access to HCW medical records will be limited to designated staff. However, medical records may be subject to disclosure, if subpoenaed.

XVII. Record Keeping and Reporting

A. HCW access to TST results

1. HCWs will be provided with a copy of the TB skin testing results and the TB screening questionnaire as required by law (see *Procedure 12)*.

B. Retention of medical records

1. All medical information obtained through the TB screening program will be maintained for the duration of employment plus 30 years, including, but not limited to:

a. TST

b. Medical examination and follow-up

c. Medical testing and procedures

d. Treatment

C. OSHA Log 200

1. TST conversions and active TB cases among HCWs will be recorded on the OSHA Log 200 annually as required by law. (If an HCW has a TST conversion and subsequently progresses to TB disease within five years of conversion, the OSHA Log 200 will be changed to reflect this progression.)

2. A positive TST result discovered within the first two weeks of employment will not be recorded on the OSHA Log 200.

3. The current OSHA Log 200 and those of the prior five years will be kept on the premises.

D. Local health department reporting

1. All known and suspected TB cases will be reported to the local health department.

2. All TST reactions and conversions will be reported to the local health department, if required.

3. Documentation will be kept for at least one year of reports to the local health department of all known or suspected TB cases.

E. Individual HCW medical records

1. Information about the following will be documented in the HCW medical records, as appropriate:

a. Results of TST and chest x-ray

b. TB symptom screening questionnaires (for TST-negative and TST-positive)

c. Documentation of:

1) TST conversion

2) Referral for medical evaluation, including evaluation for treatment of TB infection

3) Referral for medical evaluation for TB disease

4) Results of bacteriology for HCWs with TB disease

5) Completion of treatment for TB infection or TB disease

6) Compliance with criteria for return to work (see *Procedure 13)* and date of return to work

F. Data from TB screening program

1. The facility will maintain a paper or electronic database of the TB screening program as described in *Procedure 14*.

2. Analysis of TB screening data will be conducted at least annually according to *Procedure 14*.

3. Reports containing summary statistics for the TB screening program from *Procedure 14* will be:

   a. Generated for *each* _____ ***[Choose area, occupational group, job title, and/or facility, as appropriate]***, **and**

   b. Periodically submitted every _____ ***[Insert frequency, which should be at least annually]*** to _____ ***[Indicate individual, job title, committee, or department]*** for review.

4. Use of TB screening data

   a. TB screening data, in conjunction with evaluation of administrative, engineering, and respiratory protection control measures, will be used to assess the effectiveness of the facility's TB control program.

The *Policy and Procedures for Tuberculosis Screening of Health-Care Workers* has been reviewed and approved by: ***[List all persons/committees whose approval is required.]***

Approval Date	Name	Signature

Procedures

Procedure 1
Medical Risk Factors Increasing the Risk of Progression from TB Infection to TB Disease

When evaluating health-care workers and patients, attention will be paid to the following factors that increase a person's risk of progression from TB infection to TB disease:

- HIV infection
- Diabetes mellitus
- Prolonged therapy with steroids
- Immunosuppressive therapy
- Chronic renal failure
- Injection drug use in persons known to be HIV-negative
- Some hematologic disorders such as leukemias and lymphomas
- Other specific malignancies, such as carcinoma of the head or neck
- End-stage renal disease
- Weight loss greater than 10 percent below ideal body weight
- Silicosis
- Gastrectomy and jejunoileal bypass
- Chronic malabsorption syndrome
- Chronic peptic ulcer disease
- Chronic alcoholism

Reference:

Centers for Disease Control and Prevention. Screening for tuberculosis and tuberculosis infection in high-risk populations: recommendations of the Advisory Council for the Elimination of Tuberculosis. *MMWR* 1995;44(No. RR-11).

Procedure 2
Determination of Risk Assessment Categories and Frequency of TB Screening

I. Risk Assessment Categories:

A. Classification of risk for a facility, area, occupational group, or job title will be based on the following:

1. Profile of TB in the community, **and**

2. Number of infectious TB patients admitted to an area, or the estimated number of infectious TB patients with whom health-care workers (HCWs) may be in contact, **and**

3. Results of analysis of HCW tuberculin skin test (TST) conversions (when appropriate), **and**

4. Possible person-to-person transmission of *Mycobacterium tuberculosis (M. tb).*

B. The five risk assessment categories outlined by the CDC will be utilized to evaluate the potential risk of *M. tb* exposure to HCWs in the facility, area, occupational group, or job title and to assist in determining the appropriate risk category of the HCWs. The CDC's recommended screening frequency associated with each risk category will be used.

1. Minimal-risk

a. Applies only to an entire facility in which:

1) Patients with TB disease are not admitted to in-patient or out-patient areas, **and**

2) Facility is located in a community with no reported TB cases in prior year.

b. Screening frequency: HCWs will be screened at hire to determine baseline only.

2. Very low-risk

a. Generally applies only to an entire facility in which:

1) Patients with TB disease are not admitted to in-patient areas, but may receive assessment, diagnostic evaluation, or out-patient management in clinic areas, **and**

2) Patients with suspected TB disease who need in-patient care are promptly referred to another facility.

b. Although the facility as a whole is very low-risk, out-patient areas in which patients with TB disease receive care should be periodically reassessed and assigned to the appropriate low-, intermediate-, or high-risk category.

c. Screening frequency: HCWs will be screened at least annually, according to their individual risk.

3. Low-risk

a. Applies to areas, occupational groups, or job titles in which:

1) TST conversion rate is not:

a) Significantly greater than that for areas, occupational groups, or job titles in which *M. tb* exposure is unlikely, **or**

b) Significantly greater than previous conversion rates for the same area, occupational group, or job title, **and**

2) No clusters of TST conversions have occurred, **and**

3) Person-to-person transmission of *M. tb* has not been found, **and**

4) Fewer than six TB patients are seen each year.

b. Screening frequency: HCWs will be screened at least annually.

4. Intermediate-risk

a. Applies to areas, occupational groups, or job titles in which:

1) TST conversion rate is not:

a) Significantly greater than that for areas, occupational groups, or job titles in which *M. tb* exposure is unlikely, **or**

b) Significantly greater than previous conversion rates for the same area, occupational group, or job title, **and**

2) No clusters of TST conversions have occurred, **and**

3) Person-to-person transmission of *M. tb* has not been found, **and**

4) Six or more TB patients are seen each year. (Examination or treatment of 6 or more TB cases per year increases the risk of occupational exposure.)

b. Screening frequency: HCWs will be screened every six months.

5. High-risk

a. Applies to areas, occupational groups, or job titles in which:

1) TST conversion rate is:

a) Significantly greater than for areas, occupational groups, or job titles in which *M. tb* exposure is unlikely, **or**

b) Significantly greater than previous conversion rates for the same area, occupational group, or job title and nosocomial transmission is suspected, **or**

2) Cluster of TST conversions has occurred and occupational (nosocomial) transmission is suspected, **or**

3) Possible person-to-person transmission of *M. tb* has been detected.

b. Screening frequency: HCWs will be screened every three months.

C. The risk of exposure to *M. tb* may change for a facility, area, occupational group, or job title. Therefore, reassessment of risk should to be performed periodically.

[Determine the risk level and screening frequency for HCWs by area, occupational group, or job title and insert in the table on the following page.]

Reference:

Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care facilities, 1994. *MMWR* 1994;43(No. RR-13).

RISK LEVEL AND SCREENING FREQUENCY FOR HCWS BY AREA, OCCUPATIONAL GROUP, OR JOB TITLE

AREA, OCCUPATIONAL GROUP, OR JOB TITLE	RISK LEVEL	SCREENING FREQUENCY

Procedure 3
Application of the Mantoux Tuberculin Skin Test

I. Preparation

A. Seat the person comfortably.

B. Use the inner aspect of the forearm, about four inches below the elbow.

C. Avoid areas with abrasions, swelling, visible veins, or lesions.

D. Cleanse the area to be injected with an alcohol swab and let the area dry.

II. Injection process

A. The injection is made using a quarter- to half-inch, 26- or 27-gauge needle on a disposable plastic tuberculin syringe.

B. The bevel of the needle opens facing upwards.

C. The tuberculin skin test (TST) is administered by the slow intradermal injection of 0.1 ml of 5TU (tuberculin units) of purified protein derivative (PPD) just under the skin.

D. Holding the skin of the forearm tautly, the needle is inserted at a 10 to 15 degree angle without aspirating.

Note: *See illustrations, titled Applying the Tuberculin Skin Test, at the end of this procedure.*

E. A discrete, pale elevation of the skin (a wheal) 6 to 10 mm in diameter should appear.

F. The needle should be quickly withdrawn, and the site should not be massaged after the needle is withdrawn.

G. No leakage of solution should occur.

H. The site should not be covered with a bandage.

I. If this procedure is not followed accurately, the TST will be repeated immediately at another site at least two inches from the first.

III. Disposal of needles and syringes

A. Disposable needles and syringes will be placed in appropriate puncture resistant containers immediately after use.

B. If needles and syringes are not disposable, appropriate infection control measures for handling and decontamination will be followed.

IV. Tuberculin solution

A. Tuberculin solution should be removed from the vial under aseptic conditions.

B. The solution should not be transferred from one container to another or left in pre-filled syringes. If this occurs, the potency of the tuberculin solution may be diminished.

C. The solution should be kept refrigerated and, if the antigen is accidentally frozen, the solution should be discarded.

D. If the antigen is subjected to light for an extended or undetermined amount of time, the potency of the solution may be diminished and the solution should be discarded.

E. The solution should be used within one month after opening.

V. Contraindications

A. To date, no contraindications are known.

B. A TST should not be given within a three-month period following administration of a live virus vaccine (see *Procedure 6*, III.A.).

Note: *Live virus vaccines may be given at the time of the initial TST.*

VI. Adverse reactions to PPD

A. PPD should not be administered to HCWs with a documented positive TST due to severe reactions (e.g., vesiculation, ulceration, and necrosis) that may occur at the test site in highly sensitive persons.

B. If PPD is injected subcutaneously, no local reaction will develop, but a general febrile reaction and/or acute inflammation around old TB lesions may occur with highly sensitive individuals.

C. Epinephrine Hydrochloride solution (1:1000) should be readily available in case anaphylactic or acute hypersensitivity reactions occur.

D. Adverse reactions, including apparent false-positive or false-negative TST reactions, should be reported to the Food and Drug Administration Medical Products Reporting Program (see the *Physicians' Desk Reference* for a copy of the reporting form).

VII. Charting will include, but is not limited to:

A. Date TST was applied

B. Manufacturer and lot number of the injected antigen

C. Expiration date of solution

D. Dose administered

E. Injection site

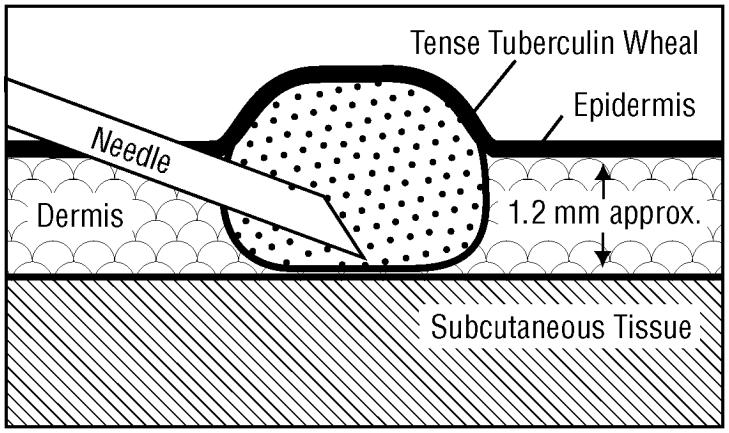
F. Signature or initials of the person who administered the TST

Reference:

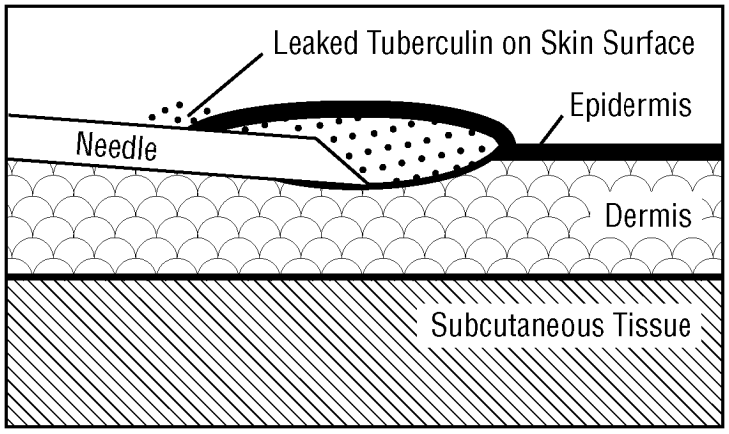
Harriman CD and Cohen FI. Screening for tuberculosis: an important prevention tool. In: Cohen FI and Durham JD. Eds. *Tuberculosis: A Sourcebook for Nursing Practice.* New York, New York: Springer Publishing Company;1995:139-155.

Applying the Tuberculin Skin Test

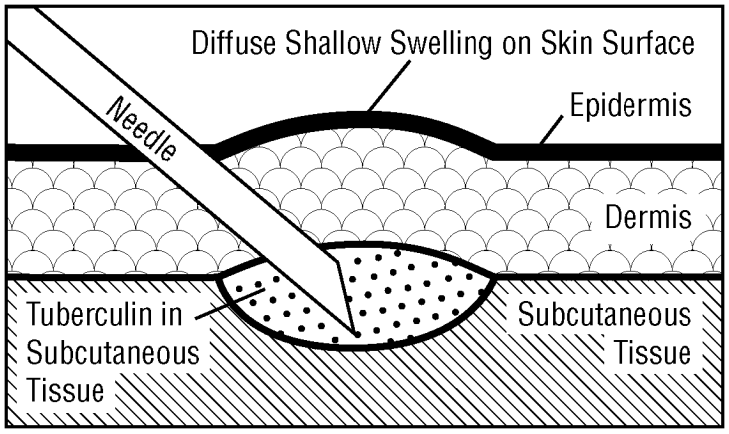
Needle Properly Inserted at Angle of 10° - 15°



Needle Too Shallow



Needle Too Deep



Procedure 4
Reading of the Mantoux Tuberculin Skin Test

I. Time frames for reading the tuberculin skin test (TST)

   A. The TST site should be read 48 to 72 hours after administration, when the majority of reactions are maximal.

   B. For some individuals in whom hypersensitivity to purified protein derivative (PPD) has waned, the full development of induration (swelling) may take up to one week or may need to be boosted.

   C. When performing the two-step TST procedure, the site may be read one week after application (see *Procedure 9, Schedule B)*.

II. Reading the TST result

   A. Reading of the TST result should be done in a good light with the forearm supported on a firm surface and slightly flexed at the elbow.

   B. First determine the presence or absence of palpable induration.

      1. In reading of the TST, disregard erythema or redness.

   C. The induration may be located visually (from a side view against the light or by direct light) and then by direct palpation.

   D. The borders of induration can also be marked with a ballpoint pen by moving the pen laterally toward the induration and stopping at one border and then repeating the process on the opposite side.

   E. Using a flexible millimeter ruler or caliper measure, measure the diameter of induration at its widest diameter transversely (side-to-side) to the long axis of the forearm. (See illustration titled *Reading the Tuberculin Skin Test (TST)* at the end of this procedure.)

III. Recording the results

   A. TST results will be noted in millimeters (mm) of induration.

   B. When there is no induration, the record will indicate 0 mm.

   C. Words such as “positive,” “negative,” “significant,” or “insignificant” will not be used in noting results.

D. The following information will be recorded in the chart:

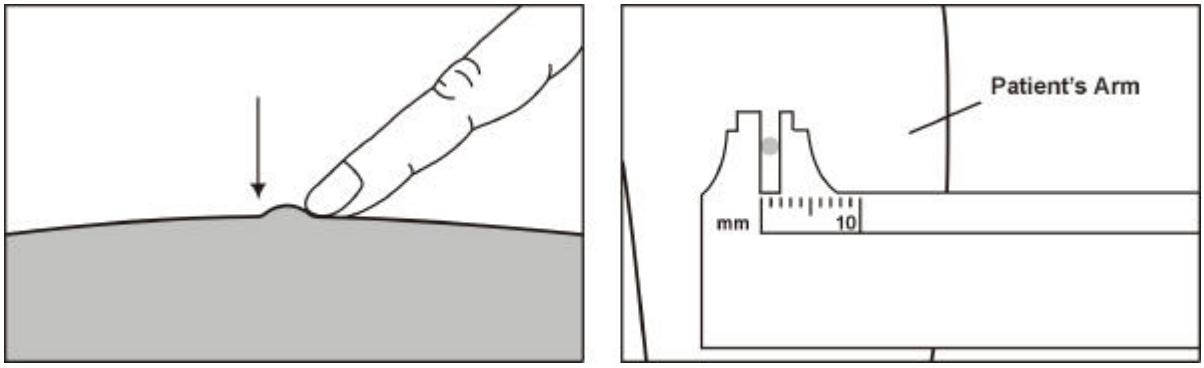
1. Size of reaction in mm
2. Date and time the test was read
3. Reader's signature or initial
4. Adverse reactions, if noted

Reference:

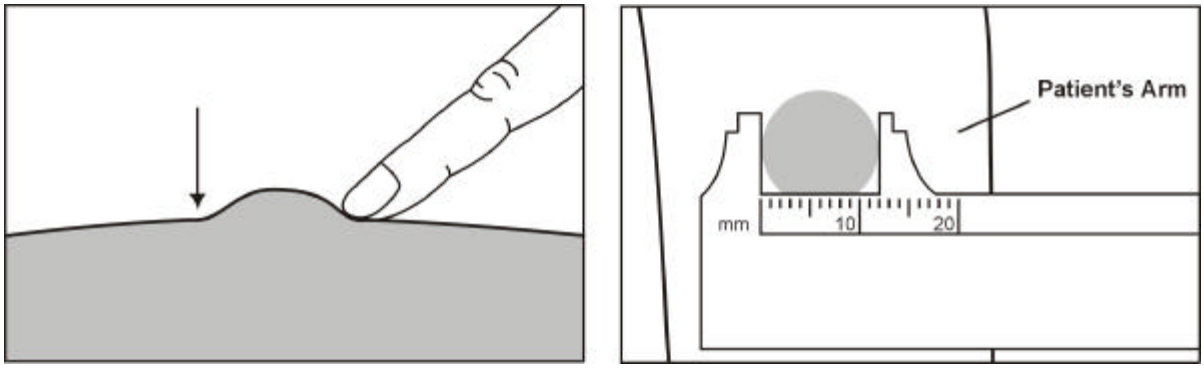
Harriman CD and Cohen FI. Screening for tuberculosis: an important prevention tool. In: Cohen FI and Durham JD. Eds. *Tuberculosis: A Sourcebook for Nursing Practice.* New York, New York: Springer Publishing Company;1995:139-155.

Reading the Tuberculin Skin Test (TST)

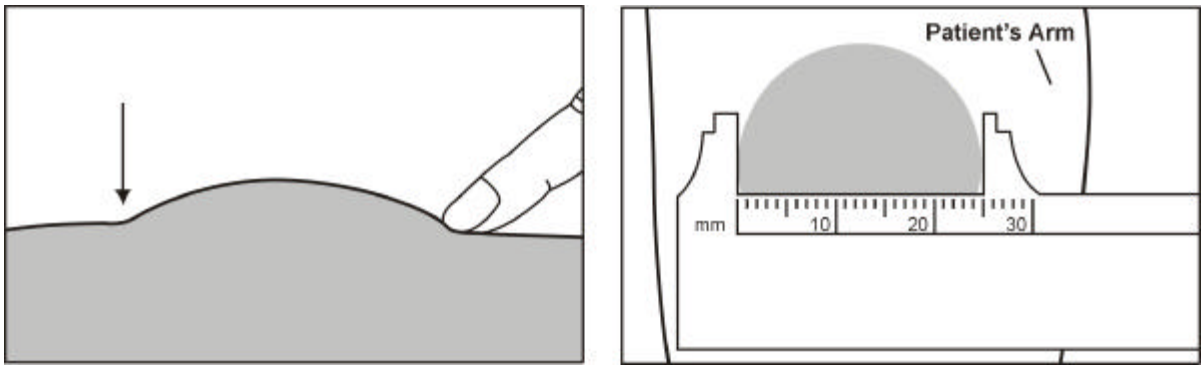
TST Reading: 2 mm induration



TST Reading: 12 mm induration



TST Reading: 25 mm induration



The illustrations above show palpation and measurement of TST induration. Erythema or redness should not be considered in palpation and measurement.

Source: Centers for Disease Control and Prevention. *The Mantoux Tuberculin Skin Testing* poster, 1990.

Procedure 5
Interpretation of Tuberculin Skin Test Results

I. Negative tuberculin skin test (TST) result

Note: *Erythema (redness) can develop in response to a TST, causing vasodilation and congestion of capillaries. Erythema should not be considered in interpreting a TST result.*

.

A. 4 millimeters (mm) or less of induration for persons described in II.A. below

B. 9 mm or less of induration for persons described in II.B. below

II. Positive TST result

A. An induration of 5 mm or greater is considered positive in the following:

1. Persons with contact to an infectious TB case

2. Persons with HIV infection or at risk for HIV infection, but who decline HIV testing

3. Persons who use intravenous drugs (if HIV status is unknown)

4. Persons with an abnormal chest x-ray, but no evidence of current TB disease

B. An induration of 10 mm or greater is considered positive in all persons who do not meet any of the above criteria, but who belong to one or more of the following high-risk groups:

1. Employees and residents of high-risk congregate settings such as health-care facilities, prisons and jails, nursing homes, mental health facilities, homeless shelters, and HIV congregate sites

2. Persons with medical conditions that increase the risk of progression from TB infection to TB disease (see *Procedure 1)*

3. Persons who use IV drugs and are known to be HIV negative

4. Foreign-born persons from countries with a high prevalence of TB

5. Certain medically under-served and low income populations

C. An induration of 15 mm or greater is considered positive in persons who do not meet any of the criteria in II.A. or II.B. above:

1. All persons with no known risk factors

2. HCWs with no known risk factors who work in facilities where the risk of TB is very low

Note: *The cut-off point (smallest size of induration at which a TST is considered positive) may vary from state to state. For example, California uses a cut-off point of 10 mm for all persons with no known risk factors (the 15-mm cut-off point described in II.C. above is not used).*

III. TST conversion

A. A change in induration of at least 10 mm from less than 10 mm to 10 mm or greater within a 2-year period of time will be considered a TST conversion.

B. For HCWs who work in facilities where *M. tb* exposure is very unlikely, an increase of 15 mm or greater within a two-year period may be more appropriate for defining a conversion. (This definition does not pertain to California.)

C. A TST conversion generally indicates new TB infection with an increased risk for progression to TB disease and indicates the need for a medical evaluation for treatment of TB infection.

Note: *All TST conversions are also positive TST results, but not all positive TST results are conversions. For example, a change of 4 mm in induration from 8 mm to 12 mm is a positive TST result, but it is not a conversion. A conversion requires a change of at least 10 mm.*

IV. Booster phenomenon

A. The ability of a person who has TB infection to respond to purified protein derivative (PPD) may gradually wane, resulting in a negative TST result on an initial test.

B. A second TST, given within a year of the first TST, could boost the immune response and the size of the hypersensitivity reaction.

C. If this second TST is placed during HCW periodic testing, a boosted reaction may be misinterpreted as a TST conversion indicating newly-acquired TB infection. The two-step TST, which will be given to all new hires without written documentation of negative TST results in the last twelve months, is designed to reduce the likelihood of this misinterpretation (see *Procedure 9)*.

D. This misinterpretation could lead to unnecessary medical treatment of HCWs; unnecessary post-exposure follow-up; over-estimation of *M. tb* transmission within the facility; unwarranted corrective action; and increased Workers' Compensation costs.

E. The frequency of boosted TST reactions increases with age and is highest among persons over 55 years of age, persons born in countries with a high prevalence of TB, and persons with a prior history of Bacillus of Calmette-Guerin (BCG) vaccine.

References:

Centers for Disease Control and Prevention. Screening for tuberculosis and tuberculosis infection in high-risk populations: recommendations of the Advisory Council for the Elimination of Tuberculosis. *MMWR* 1995;(No. RR-11):44.

Harriman CD and Cohen FI. Screening for tuberculosis: an important prevention tool. In: Cohen FI and Durham JD. Eds. *Tuberculosis: A Sourcebook for Nursing Practice.* New York, New York: Springer Publishing Company;1995:139-155.

Huebner RE, Schein MF and Bass JB. The tuberculin skin test. *Clinical Infectious Diseases* 1993;17:968-97.

Menzies D, Interpretation of Repeated Tuberculin Tests: Boosting, Conversion, Reversion. *Am J Respir Crit Care Med* 1999;159:15-21.

Procedure 6
Factors Associated with False Tuberculin Skin Test Reactions and Results

I. Factors associated with false-positive tuberculin skin test (TST) reactions

   A. Cross reactions from other mycobacteria, such as infection with non-tuberculous mycobacteria

   B. Recent vaccination with Bacillus of Calmette-Guerin (BCG)

      1. BCG vaccination may produce a TST reaction that cannot be distinguished reliably from a reaction caused by TB infection.

      2. For the health-care worker (HCW) who was vaccinated with BCG, the probability that a positive TST results from infection with *Mycobacterium tuberculosis (M. tb)*, rather than BCG vaccine, increases as the:

         a. Size of the documented TST reaction increases

         b. HCW has contact with a source of TB disease

         c. HCW's country of origin has a high prevalence of TB

         d. Time interval between vaccination and TST increases (e.g., a TST reaction of 10 mm or greater probably can be attributed to TB infection in an adult vaccinated with BCG as an infant)

II. Factors associated with a diminished response to purified protein derivative (PPD), including false-negative TST reactions

   A. Factors associated with the person being tested

      1. Infections

         a. HIV

         b. Viral (e.g., measles, mumps, chickenpox)

         c. Bacterial (e.g., typhoid fever, typhus, pertussis)

         d. Fungal

      2. Live virus vaccinations (measles, mumps, varicella, and polio)

         a. A false-negative reaction may occur if a TST is given within three months after vaccination

3. Metabolic derangements (chronic renal failure)
4. Nutritional factors (severe protein depletion)
5. Diseases affecting lymphoid organs
6. Use of corticosteroids and other immunosuppressive agents
7. Age (newborns and elderly)
8. Stress

B. Factors related to tuberculin solution

1. Exposure to heat and light
2. Improper storage or dilution
3. Contamination
4. Use of solution after expiration date

C. Factors related to administration

1. Injection of too little antigen
2. Leakage of solution from the site
3. Use of pre-filled syringes
4. Injection not intradermal

III. Factors associated with false-positive or false-negative TST results

A. Error in reading TST results

B. Error in recording TST results

C. TST results recorded as negative or positive instead of in millimeters of induration

D. Conscious or unconscious bias of the reader

References:

Harriman CD and Cohen FI. Screening for tuberculosis: an important prevention tool. In: Cohen FI and Durham JD. Eds. *Tuberculosis: A Sourcebook for Nursing Practice.* New York, New York: Springer Publishing Company; 1995:139-155.

Menzies D. Interpretation of repeated tuberculin tests: boosting, conversion, reversion. *Am J Respir Crit Care Med* 1999;159:15-21.

Procedure 7a
Pre-Placement/Initial TB Screening

I. Pre-placement TB screening will be provided upon hire to all health-care workers (HCWs) and volunteers with potential exposure to aerosolized *Mycobacterium tuberculosis (M. tb).*

II. Initial TB screening will be provided to the HCW who is not participating in the TB screening program and who changes from a position or duties with no potential for *M. tb* exposure to a position or duties with *M. tb* exposure potential.

   A. Some of these HCWs may need to comply with two-step tuberculin skin testing (TSTs), in accordance with *Procedure 9*.

III. All HCWs will complete pre-placement/initial TST, as appropriate, and a TB screening questionnaire that includes a medical history and a symptom review for TB disease (see *Procedure 7b)*.

   A. If the HCW reports any symptoms of TB, *Procedure 8* will be followed.

   B. HCWs with a history of Bacillus of Calmette-Guerin (BCG) vaccination will be given a TST if:

      1. No written documentation is provided to demonstrate a history of a positive TST, **or**

      2. The HCW's last TST was documented negative.

   C. Documented prior negative TST less than 12 months ago (see *Flowchart 1)*

      1. If the HCW provides written documentation of a negative TST within the prior 12 months, the HCW will be given a baseline TST and a TB screening questionnaire.

         a. If the TST result is negative and the HCW has no symptoms of TB disease, the HCW may be cleared to work.

         b. If the TST result is positive, the HCW will receive a chest x-ray.

            1) If the chest x-ray indicates no findings consistent with TB disease and the HCW has no symptoms of TB disease, the HCW may be cleared to work.

               a) The HCW will be referred to a primary care provider or a TB clinic for a medical examination and evaluation for treatment of TB infection.

b) If required by law, a report of the positive TST or TST conversion will be made to the local health department.

c) If appropriate, the HCW will also be referred to the prior employer for follow-up of the potentially work-related TST conversion or positive TST.

2) <u>If the chest x-ray indicates findings consistent with TB disease</u>:

a) The HCW will be referred for immediate medical care.

b) The criteria for clearance to return to, or start, work in *Procedure 13* will be met.

c) Post-exposure follow-up will be conducted, if appropriate.

D. Undocumented TST, or documented negative TST 12 or more months ago, or no prior TST (see *Procedure 9 and Flowcharts 2 and 3)*

1. HCWs will receive two-step TSTs in order to:

a. Establish an accurate baseline for future TB screening

b. Detect individuals with past TB infection who may have diminished skin test reactivity, resulting in a false negative initial test (see *Procedure 5, Section IV)*

c. Reduce the possibility that a boosted reaction is interpreted as a new TB infection

d. Make appropriate decisions regarding treatment for TB infection

2. The result of the second TST will be the valid baseline for the HCW who had an initial negative TST.

E. Documented prior positive TST (see *Flowchart 4)*

1. The HCW will complete a TB screening questionnaire and will be cleared to work if the HCW meets all the following criteria:

a. Has written documentation of a prior positive TB skin test, **and**

b. Has a chest x-ray taken within the prior 12 months that indicates no findings consistent with TB disease, **and**

c. Has no symptoms of TB disease as indicated by the TB screening questionnaire.

2. If the HCW has no prior chest x-ray or a chest x-ray 12 or more months ago, the HCW will be given a chest x-ray.

    a. <u>If the chest x-ray indicates no findings consistent with TB disease</u>, and the HCW has no symptoms of TB disease, the HCW may be cleared to work.

    b. <u>If the chest x-ray indicates findings consistent with TB disease</u>:

        1) The HCW will be referred for immediate medical care.

        2) The criteria for clearance to return to, or start, work in *Procedure 13* will be met.

        3) Post-exposure follow-up will be conducted, if appropriate.

3. The HCW will be counseled to report any symptoms of TB to _____ ***[Insert individual, job title, or department]*** promptly.

Procedure 7b
Pre-Placement/Initial TB Screening Questionnaire

A pre-placement/initial TB screening questionnaire will be used for all health-care workers (HCWs) at the time of hire (pre-placement screening). This questionnaire will also be used when an HCW is not participating in TB screening and changes from a position or duties with no potential for exposure to *Mycobacterium tuberculosis (M. tb)* to a position or duties potentially exposing the HCW to *M. tb* (initial screening). The questionnaire will be used for all HCWs regardless of their tuberculin skin test status.

The following is an example of a pre-placement/initial TB screening questionnaire that has been adapted from a questionnaire developed by the Occupational Health Branch/California Department of Health Services.

TB Screening Questionnaire **CONFIDENTIAL** **Pre-placement/Initial**

_____ Date Form Completed ___/___/___
Last Name First Name Middle Initial Mo Dy Yr

Date of Birth ___/___/___ Social Security Number _____-_____-_____
Mo Dy Yr

Department _____ Job Title _____ Work Phone_____

1. Please check the general category that best describes your current job title ***[Develop facility-specific categories from the examples below.]***

[ ] Admitting Clerk **[ ]** Housekeeper **[ ]** Maintenance Worker
[ ] Physician **[ ]** RN **[ ]** Respiratory Therapist

2. Check one general category that best describes where you will spend most of the work day ***[Develop facility-specific categories from the examples below.]***

[ ] Admitting/Registration **[ ]** Emergency Room **[ ]** Radiology
[ ] Laboratory **[ ]** Pharmacy **[ ]** Many Locations

3. Were you born in the U.S.A.?

[ ] Yes **[ ]** No

a. If no, what is your country of birth? _____

b. What year did you move to the U.S.A.? 19____ 20____ **[ ]** Don't know

4. Have you traveled or lived outside the U.S.A. in the last 2 years?

[ ] Yes **[ ]** No

a. If yes, where? _____

5. Have you ever had a TB skin test? (Bubble under skin, not four-prong test)

[ ] Yes **[ ]** No **[ ]** Don't know

a. If yes, when was your last test? _____/_____/_____

b. What was the test result?

[ ] Positive **[ ]** Negative **[ ]** Don't know

c. Do you have a copy of this result in writing?

[ ] Yes **[ ]** No **[ ]** Don't know

d. If the test result was positive, what medication(s) did you take?

[ ] Isoniazid (INH) **[ ]** None **[ ]** Other _____ **[ ]** Don't know

6. Have you ever received BCG vaccine? (BCG is a vaccine used to prevent TB)

[ ] Yes **[ ]** No **[ ]** Don't know

7. Have you ever been treated for TB disease?

[ ] Yes **[ ]** No **[ ]** Don't know

a. If yes:

1. In what year did you start treatment? 19____ 20____ **[ ]** Don't know
2. What medication did you take? _____
3. How long did you take this medication? _____

8. Have you ever had a chest x-ray?

[ ] Yes **[ ]** No **[ ]** Don't know

a. If yes, when was your last chest x-ray? _____/_____/_____

9. Has a health practitioner ever told you that your immune system isn't working right or can't fight infection?

[ ] Yes **[ ]** No **[ ]** Don't know

10. Do you work, volunteer, or live in another facility that provides medical or social services?

[ ] Yes **[ ]** No

a. If yes, where? _____

11. Have you ever had any of the following symptoms for more than 3 weeks at a time? (Please check all that apply)

[ ] Persistent coughing **[ ]** Excessive fatigue **[ ]** Coughing up blood
[ ] Hoarseness **[ ]** Excessive sweating at night **[ ]** Persistent fever
[ ] Excessive weight loss

Do not write below this line

Date TST Applied	Initials	Site (RA/LA)	Product Name	Lot #	Expiration Date	Dose (TU)	Date Read	Initials	Induration (mm)
___/___/___	_____	_____	_____	_____	___/___/___	_____	___/___/___	_____	_____
___/___/___	_____	_____	_____	_____	___/___/___	_____	___/___/___	_____	_____

Procedure 8
Follow-Up to the Health-Care Worker with Positive TB Symptom Screen

(See *Flowchart 5)*

I. The health-care worker (HCW) will be referred to _____ ***[Insert individual, job title, or department]*** for a TB symptom assessment* if the HCW:

   A. Reports any symptoms of TB disease on the TB screening questionnaire, **or**

   B. Reports symptoms at any other time.

Note: *If the tuberculin skin test (TST) has been placed and not yet read at the time the HCW is referred for TB symptom assessment, the TST will be read and the result documented. Follow-up for TST-positive results will be provided, as indicated.*

II. If the symptom assessment suggests that HCW-reported symptoms may be consistent with TB disease, a chest x-ray will be obtained immediately, regardless of TST status.

   A. <u>If the symptoms are highly suspicious of TB disease</u> (e.g., a cough of more than 3 weeks duration, night sweats, and unexplained weight loss), the HCW will not be scheduled to work or will be delayed in starting work until after results of the chest x-ray are obtained.

   B. <u>If the chest x-ray shows no findings consistent with TB disease</u>, the HCW may return to, or begin, work.

   C. <u>If the chest x-ray is suggestive of TB disease</u>, a medical evaluation** will be obtained as soon as possible. Criteria for return to work in *Procedure 13* will be met. Post-exposure follow-up will be conducted, if appropriate.

   D. <u>If the HCW has reported immunosuppression</u>, a medical evaluation will be obtained as soon as possible, regardless of chest x-ray result. Criteria for return to work in *Procedure 13* will be met.

---

* Symptom assessment involves a determination of whether HCW-reported symptoms are consistent with TB, or whether symptoms are more likely associated with another medical condition.

** Medical evaluation includes a history, physical examination, and bacteriology (if appropriate) to either rule out TB or identify the HCW as a suspected TB case.

Procedure 9
Procedure for Two-Step Tuberculin Skin Test

I. A two-step tuberculin skin test (TST) will be utilized to establish baseline TSTs on new hires who:

   A. Have never had a TST, **or**

   B. Have no written documentation of prior testing, **or**

   C. Have not had a TST within the last 12 months.

   Note: *Two-step TSTs are not appropriate for periodic and post-exposure follow-up screening.*

   Note: *Two-step TSTs will also be used to establish baseline TSTs for health-care workers (HCWs) who transfer from positions/areas with no potential for Mycobacterium tuberculosis (M. tb) exposure to positions/areas with potential M. tb exposure, and who meet the criteria for two-step testing above.*

II. The procedure will be performed on one of the following two schedules:

   1. Schedule A

      a. Schedule A requires **4 visits** to complete the TB screening, one more visit than Schedule B. However, the advantage of Schedule A is that most HCWs may be cleared to begin work in approximately 2-3 days.

      b. If the first TST is negative, the HCW will be conditionally cleared to work pending the results of the second TST.

      c. The HCW must return one week later for a second TST application and then again for the second TST reading.

   2. Schedule B

      a. Schedule B requires **3 visits** to complete the TB screening.

      b. The first TST will be read one week after application. If the TST is negative, the HCW will be conditionally cleared to work, pending the results of the second TST. The second TST will be applied at this time and read 2 to 3 days later.

[Choose Schedule A (Section III) or Schedule B (Section IV) below. Delete the section not selected and delete Section II above.]

III. Schedule A (See *Flowchart 2)*

A. **Visit 1, Day 1**

1. Place the first TST

2. Require HCW to return in 48-72 hours for TST to be read

3. Administer and evaluate the TB screening questionnaire

a. If the HCW has any symptoms of TB disease, *Procedure 8* will be followed.

B. **Visit 2, Day 3 or 4**

1. Read the first TST

a. If the TST result is negative, and the HCW has no symptoms of TB disease:

1) The HCW may be conditionally cleared to work, pending the results of the second TST.

2) The HCW will return for a second TST in one week.

b. If the TST result is positive, the HCW will receive a chest x-ray.

Note: *No further TSTs will be given.*

1) If the chest x-ray indicates no findings of TB disease and the HCW has no symptoms of TB disease, the HCW may be cleared to work.

a) The HCW will be referred to a primary care provider or TB clinic for medical examination and evaluation for treatment of TB infection.

b) If required by law, a report of the positive TST or TST conversion will be made to the local health department.

2) If the chest x-ray indicates findings consistent with TB disease:

a) The HCW will be referred for immediate medical care.

b) The criteria for clearance to start work in *Procedure 13* will be met.

C. **Visit 3, Day 7**

1. Place the second TST, if the initial TST was negative.

D. **Visit 4, Day 9 or 10**

1. Read the second TST

a. If the TST result is negative, the HCW will be given final clearance to work.

b. If the TST result is positive, the procedure described for follow-up of positive TST results described in Schedule A **Visit 2** above will be followed.

IV. Schedule B (See *Flowchart 3)*

A. **Visit 1, Day 1**

1. Place the first TST.

2. Require the HCW to return in seven days for the TST to be read.

3. Administer and evaluate TB screening questionnaire.

a. If the HCW has any symptoms of TB disease, *Procedure 8* will be followed.

B. **Visit 2, Day 7**

1. Read the first TST

a. If the TST result is negative, and the HCW has no symptoms of TB disease, the HCW may conditionally start work, pending the results of the second TST. A second TST will be placed at this time.

b. If the TST result is positive, the HCW will receive a chest x-ray.

Note: *No further TSTs will be given.*

1) If the chest x-ray findings are not consistent with TB disease and the HCW has no symptoms of TB disease, the HCW may be cleared to work.

a) The HCW will be referred to a primary care provider or TB clinic for medical examination and evaluation for treatment of TB infection.

2) If the chest x-ray indicates findings consistent with TB disease:

a) The HCW will be referred for immediate medical care.

b) The criteria for clearance to start work in *Procedure 13* will be met.

C. **Visit 3, Day 9 or 10**

1. Read the second TST.

   a. If the TST result is negative, the HCW will be given final clearance to work.

   b. If the TST result is positive, the procedure described for follow-up of positive TST results described in Schedule B **Visit 2** above will be followed.

Procedure 10a
Periodic TB Screening

I. Periodic TB screening will be provided to all health-care workers (HCWs) and volunteers with potential exposure to *Mycobacterium tuberculosis (M. tb)* during the course of their work.

(See *Procedure 2: Determination of Risk Assessment Categories and Frequency of TB Screening.)*

A. Negative tuberculin skin test (TST) on last test (see *Flowchart 6)*

1. HCWs whose last TST result was negative will be given a TST and TB screening questionnaire.

a. If the HCW has any symptoms of TB disease, *Procedure 8* will be followed.

b. If the TST is negative and the HCW has no symptoms of TB disease, the HCW may continue to work.

c. If the TST is positive, the HCW will be given a chest x-ray immediately.

1) If the chest x-ray findings are not consistent with TB disease and the HCW has no symptoms of TB disease, the HCW may continue working.

2) If the chest x-ray indicates findings consistent with TB disease, the HCW will be referred for immediate medical care and the criteria for clearance to return to work in *Procedure 13* will be met. Post-exposure follow-up will be conducted, if appropriate.

3) If the positive TST is a conversion:

a) An investigation to identify the potential source of the TST conversion and other HCW TST conversions will be initiated, unless there is compelling evidence that the HCW became infected outside the facility.

b) If other TST conversions are identified, TST screening will be performed every three months in the same area or occupational group until no other conversions are found.

c) If required by law, the local health department will be notified of the TST conversion.

B. Positive TST on prior test (see *Flowchart 7)*

1. HCWs with documented positive TSTs will complete a TB screening questionnaire at the same frequency as TSTs are provided to other HCWs at the same risk level.

   a. If the HCW has any symptoms of TB disease, follow-up will be provided per *Procedure 8.*

   b. If the HCW has no symptoms consistent with TB disease, the HCW may continue to work.

   Note: *HCWs with a history of a positive TST will not receive periodic chest x-rays in the absence of TB symptoms.*

Procedure 10b
Periodic/Post-Exposure TB Screening Questionnaire for Health-Care Worker Whose Last Tuberculin Skin Test Was Negative

A periodic/post-exposure TB screening questionnaire will be used for all health-care workers whose last tuberculin skin test was negative, and who are screened periodically and after exposure to *Mycobacterium tuberculosis*.

The following is an example of a periodic/post-exposure TB screening questionnaire that has been adapted from a questionnaire developed by the Occupational Health Branch/California Department of Health Services.

TB Screening Questionnaire **CONFIDENTIAL** **Periodic/Post-Exposure: Last Tuberculin Skin Test Negative**

_____ Date Form Completed ___/___/___
Last Name First Name Middle Initial Mo Dy Yr

Date of Birth ___/___/___ Social Security Number _____-_____-_____
Mo Dy Yr

Department _____ Job Title _____ Work Phone_____

1. Please check the general category that best describes your current job title ***[Develop facility-specific categories from the examples below.]***

[ ] Admitting Clerk **[ ]** Housekeeper **[ ]** Maintenance Worker
[ ] Physician **[ ]** RN **[ ]** Respiratory Therapist

2. Check *one* general category that best describes where you will spend *most* of the work day ***[Develop facility-specific categories from the examples below.]***

[ ] Admitting/Registration **[ ]** Emergency Room **[ ]** Radiology
[ ] Laboratory **[ ]** Pharmacy **[ ]** Many Locations

3. Since your last TB skin test, have you worked in a location where patients with active TB received care or services?

[ ] Yes **[ ]** No **[ ]** Don't know

4. Since your last TB skin test, have you lived with or had close contact with someone who has TB disease?

[ ] Yes **[ ]** No **[ ]** Don't know

5. Since your last TB skin test, has your negative skin test turned to positive?

[ ] Yes **[ ]** No **[ ]** Don't know

6. Since your last TB skin test, have you had an abnormal chest x-ray?

[ ] Yes **[ ]** No **[ ]** Don't know

7. Since your last TB skin test, has a health practitioner told you that your immune system isn't working right or can't fight infection?

[ ] Yes **[ ]** No **[ ]** Don't know

8. Do you work, volunteer, or live in another facility that provides medical or social services?

[ ] Yes **[ ]** No **[ ]** Don't know

9. Since your last TB skin test, have you traveled outside the U.S.A.?

[ ] Yes **[ ]** No **[ ]** Don't know

a. If yes, where?

_____

10. Since your last TB skin test, have you had any of the following symptoms for more than 3 weeks at a time? *(Please check all that apply)*

[ ] Persistent coughing **[ ]** Excessive fatigue **[ ]** Coughing up blood
[ ] Hoarseness **[ ]** Excessive sweating at night **[ ]** Persistent fever
[ ] Excessive weight loss

Do not write below this line

Date TST Applied	Initials	Site (RA/LA)	Product Name	Lot #	Expiration Date	Dose (TU)	Date Read	Initials	Induration (mm)
___/___/___	_____	_____	_____	_____	___/___/___	_____	___/___/___	_____	_____
___/___/___	_____	_____	_____	_____	___/___/___	_____	___/___/___	_____	_____

Procedure 10c
Periodic/Post-Exposure TB Screening Questionnaire for Health-Care Workers with a Prior Positive Tuberculin Skin Test

A periodic/post-exposure TB screening questionnaire will be used for all health-care workers who have a prior positive tuberculin skin test result, and who are screened periodically and after exposure to *Mycobacterium tuberculosis*.

The following is an example of the periodic/post-exposure TB screening questionnaire that has been adapted from a questionnaire developed by the Occupational Health Branch/California Department of Health Services.

TB Screening Questionnaire **CONFIDENTIAL** **Periodic/Post-Exposure: History of Positive Tuberculin Skin Test**

_____ Date Form Completed ___/___/___
Last Name First Name Middle Initial Mo Dy Yr

Date of Birth ___/___/___ Social Security Number _____-_____-_____
Mo Dy Yr

Department _____ Job Title _____ Work Phone_____

1. Please check the general category that best describes your current job title ***[Develop facility-specific categories from the examples below.]***

[ ] Admitting Clerk **[ ]** Housekeeper **[ ]** Maintenance Worker
[ ] Physician **[ ]** RN **[ ]** Respiratory Therapist

2. Check *one* general category that best describes where you will spend *most* of the work day ***[Develop facility-specific categories from the examples below.]***

[ ] Admitting/Registration **[ ]** Emergency Room **[ ]** Radiology
[ ] Laboratory **[ ]** Pharmacy **[ ]** Many Locations

3. Since your last TB review, have you worked in a location where patients with active TB received care or services?

[ ] Yes **[ ]** No **[ ]** Don't know

4. Since your last TB review, have you lived with or had close contact with someone who has TB disease?

[ ] Yes **[ ]** No **[ ]** Don't know

5. Since your last TB review, have you had an abnormal chest x-ray?

[ ] Yes **[ ]** No **[ ]** Don't know

6. Since your last TB review, has a health practitioner told you that your immune system isn't working right or can't fight infection?

[ ] Yes **[ ]** No **[ ]** Don't know

7. Do you work, volunteer, or live in another facility that provides medical or social services?

[ ] Yes **[ ]** No **[ ]** Don't know

8. Since your last TB review, have you traveled outside the U.S.A.?

[ ] Yes **[ ]** No **[ ]** Don't know

a. If yes, where?

_____

9. Since your last TB review, have you had any of the following symptoms for more than 3 weeks at a time? *(Please check all that apply)*

[ ] Persistent coughing **[ ]** Excessive fatigue **[ ]** Coughing up blood
[ ] Hoarseness **[ ]** Excessive sweating at night **[ ]** Persistent fever
[ ] Excessive weight loss

Procedure 11
Post-Exposure Follow-Up of Health-Care Workers

I. Post-exposure follow-up is triggered by suspected (see Section II below) and confirmed (see Section III below) health-care worker (HCW) exposure incidents. The following definition of a *confirmed* exposure incident to *Mycobacterium tuberculosis (M. tb)* will be used:

   A. Significant contact, without the benefit of all appropriate exposure control measures, that occurs during the performance of the HCW's duties to either A.1. or A.2. below:

      1. A person (patient or HCW) whose sputum culture or nucleic acid amplification test (NAAT) is positive for *M. tb*, and who has NOT met all four (4) criteria below to indicate that the person is non-infectious:

         a. Has had three (3) consecutive negative acid-fast bacilli (AFB) sputum smears on three different days; **and**

         b. Has completed at least two (2) weeks of multi-drug anti-tuberculosis therapy if AFB sputum smear was ever positive, or four (4) days of multi-drug anti-tuberculosis therapy if AFB sputum smear was always negative; **and**

         c. Has exhibited clinical improvement; **and**

         d. Has/has had continued close medical supervision.

      2. Air that may have contained aerosolized *M. tb*

   B. Factors that will be used to determine the significance of contact include, but are not limited to, the following:

      1. HCW's proximity to the TB case

      2. Duration of HCW's contact to the TB case

      3. Use of exposure control measures that are functioning appropriately at the time of contact

   C. Examples in which significant *M. tb* exposure may occur include, but are not limited to, the following:

      1. HCW without respiratory protection exposed to unmasked coughing TB patient

2. Failure to identify TB patient as a suspected case of pulmonary TB and failure to promptly isolate patient in a negative pressure isolation room

3. Negative pressure isolation room found to be under positive pressure while occupied by a TB patient

4. Door to isolation room left open while the room was in use by a TB patient

5. Failure of biological safety cabinet during specimen processing for AFB and *M. tb* culture (specimens later found to be positive for *M. tb)*

6. Unidentified infectious TB patient in clinic waiting room, and air from waiting room re-circulated to administrative offices

7. Sputum induction conducted on infectious TB patient without local exhaust ventilation hood or booth, and HCW did not use respiratory protection while assisting the patient

8. Bronchoscopy performed on an infectious TB patient or autopsy performed on a cadaver with TB disease of any site, and HCW did not wear respiratory protection

9. Bronchoscopy or autopsy performed on an infectious TB patient in a room that lacked exhaust ventilation

D. Examples in which significant *M. tb* exposure would <u>not</u> likely occur include, but are not limited to, the following:

1. HCW wore N-95 respirator while caring for TB patient in negative pressure isolation room, and HCW was fit tested with this respirator

2. Sputum induction of TB patients performed in a well-functioning booth with HCW present in the room *outside* the booth, and door to booth remained closed until adequate time had elapsed to clear the booth of *M. tb*

3. Patient masked, observed for compliance with masking, and segregated during brief clinic stay

II. HCW follow-up to a *suspected* exposure incident

A. The primary objective is to identify potentially exposed HCWs so that, if the sputum culture or NAAT is positive for *M. tb,* TST and TB symptom screening (see Section III) of HCWs with significant exposure can be initiated promptly.

B. A suspected exposure incident occurs when the sputum culture or NAAT for *M. tb* of a suspected infectious TB case is pending *and* the potential for significant exposure existed. (See Sections I.B.-I.D. above regarding significance of *M. tb* exposure.)

C. HCW follow-up to a suspected exposure incident will be initiated as soon as possible when:

1. HCW has significant contact, without the benefit of all appropriate exposure control measures, to a suspected infectious case of pulmonary or laryngeal TB, defined as a person who:

a. Is infected with *M. tb* (TST-positive) and has signs or symptoms of TB disease of the lungs or larynx, **or**

b. Has a positive AFB sputum smear, **or**

c. Has a persistent cough lasting 3 or more weeks and 2 or more symptoms of TB disease (e.g., bloody sputum, night sweats, unexplained weight loss, persistent fatigue, fever), **or**

d. Has been started on anti-tuberculosis medications for clinical suspicion of pulmonary or laryngeal TB, but has completed less than 2 weeks of treatment, if ever AFB sputum smear positive, or 4 days of treatment, if always AFB sputum smear negative

Note: *If the person's condition described in 1.a.-1.c. above has been medically determined to result from a cause other than TB disease, the person will not be considered a suspected infectious TB case.*

D. The suspected TB case will be interviewed, if possible, to determine the likely infectious period and to identify HCWs who may have had significant exposure to the case. Work-site supervisors will be also be interviewed.

E. If the suspected TB case is a patient, the chart will be reviewed to verify information provided by the patient and to obtain information on patient location(s) to aid identification of exposed HCWs.

F. A memo will be posted in HCW-only areas of all departments in which a suspected exposure incident may have occurred to alert HCWs who wish to self-identify.

G. Each identified HCW will be interviewed to determine the approximate duration and conditions of *M. tb* exposure during the suspected TB case's infectious period. HCWs will be encouraged to report their immune status to ensure that immunocompromised HCWs receive priority in follow-up evaluation and to guide decisions regarding treatment for TB infection.

H. Within one week of identification of the suspected infectious TB case, a list of HCWs who had a suspected exposure incident will be generated.

Note: *If the infectious TB case was not suspected prior to confirmation by positive sputum culture or NAAT for M. tb, II.D. through II.H. above will be completed as soon as possible.*

III. HCW follow-up to a *confirmed* exposure incident

A. The primary objective is to identify HCWs with TST conversions and symptoms of TB disease to ensure prompt and appropriate medical follow-up.

B. HCW post-exposure follow-up to a confirmed exposure incident will occur within one week of receipt of a positive sputum culture or NAAT for *M. tb*.

C. All immunocompromised HCWs who may have been exposed, regardless of results of TST or TB symptom screen, will receive a chest x-ray and medical evaluation immediately. If findings of chest x-ray are consistent with TB disease, criteria for return to work in *Procedure 13* will be met.

Note: *For post-exposure follow-up TSTs, a negative TST is defined as less than 5 mm, and a positive TST is defined as 5 mm or greater.*

D. Exposed HCWs whose last TST was negative will be administered a post-exposure baseline TST and a TB screening questionnaire (see *Flowchart 8)*.

1. If the HCW has any symptoms of TB disease, *Procedure 8* will be followed.

2. HCWs who have had a negative TST within the last three months may use that test and a new TB screening questionnaire as a baseline.

3. If the TST and the TB symptom review are negative at post-exposure baseline, the HCW will return for re-testing in 10 to 12 weeks.

a. If the second TST is negative, no further follow-up is necessary for this exposure. (However, if two or more TST conversions are associated with this exposure, TSTs will be performed every three months until no further conversions are detected.)

b. If the second TST is positive, the HCW will receive a chest x-ray.

1) If the chest x-ray findings are not consistent with TB disease and the HCW has no symptoms of TB disease, the HCW may continue working.

2) If required by law, the local health department will be notified of TST conversions and positive TST results.

3) If the chest x-ray indicates findings consistent with TB disease, the HCW will be referred for immediate medical care, and the criteria for clearance to return to work in *Procedure 13* will be met.

4. If the TST is positive at post-exposure baseline, the HCW will be given a chest x-ray and medical evaluation. If a conversion is found at baseline, the HCW will be considered infected from another source, not the current

exposure, unless more than 2 weeks has elapsed since the first exposure to the current TB case.

a. <u>If the chest x-ray findings are not consistent with TB disease</u> and the HCW has no symptoms of TB disease, the HCW may continue working.

b. <u>If the chest x-ray indicates findings consistent with TB disease:</u>

1) The HCW will be referred for immediate medical care.

2) The criteria for clearance to return to work in *Procedure 13* will be met.

c. An investigation to identify the potential source of the TST conversion or TB disease will be initiated unless there is compelling evidence that the HCW became infected outside the facility.

5. If more than 12 weeks has elapsed since last contact with the TB case, and post-exposure baseline testing has not been done, a TST and a screening questionnaire will be administered only once.

E. HCWs whose last TST was positive (see *Flowchart 9)*

1. HCWs with a prior positive TST will complete a TB screening questionnaire. They will be counseled to report any symptoms of TB disease to _____ ***[Insert individual, job title, or department]*** at any time.

2. *Procedure 8* will be followed, if the HCW:

a. Reports any TB symptoms on the questionnaire, **or**

b. Reports TB symptoms at any other time.

Note: *Asymptomatic HCWs with a history of a positive TST, but without known HIV infection, will not be given post-exposure chest x-rays. However, if there is concern about re-infection with M. tb in an HCW (due to evidence of significant transmission among other HCWs with similar conditions of M. tb exposure) or concern about whether the HCW is a source case of TB, a chest x-ray may be indicated.*

IV. Responsibilities for HCW post-exposure follow-up

A. A detailed listing of responsibilities and activities for post-exposure follow-up is shown at the end of this procedure. ***[Insert individual, job title, or department to complete this table.]***

V. Reporting to the local health department

A. Suspected and confirmed TB cases will be reported to the local health department as soon as they are identified.

B. If required by law, the local health department will be notified of TST conversions and positive TST results.

RESPONSIBILITIES FOR HEALTH-CARE WORKER POST-EXPOSURE FOLLOW-UP

ACTIVITIES	INDIVIDUAL, JOB TITLE, OR DEPARTMENT RESPONSIBLE
Identifies health-care workers occupationally exposed to *M. tb* by interviewing patient, area supervisor, and reviewing chart	
Writes notification letter and ensures all identified health-care workers are aware of *M. tb* exposure	
Places notice on employee bulletin board in all at-risk departments so that health-care workers can self-identify	
Interviews identified health-care workers to confirm *M. tb* exposure	
Organizes and tracks TB screening and tuberculin skin testing	
Places and interprets tuberculin skin tests, and records results	
Evaluates TB screening questionnaires	
Ensures health-care worker with tuberculin skin test conversion or TB symptoms is referred for further evaluation	
Performs medical history, physical examination, and other related tests, if indicated	
Performs medical management and follow-up of health-care workers with TB infection and TB disease	
Records occupational TB infections/tuberculin skin test conversions and active TB disease on OSHA Log 200 and completes required paperwork	
Ensures that health-care workers with suspected or known infectious TB do not return to the workplace until non-infectious	
Notifies local health department of suspected and confirmed TB cases promptly, as required by law	
Notifies local health department of tuberculin skin test conversions and positive tuberculin skin test results if required by law	
Complies with required screening and follow-up as appropriate	All health-care workers

Procedure 12
Health-Care Worker Notification of Tuberculin Skin Test Results

I. Health-care workers (HCWs) will be notified of tuberculin skin test (TST) results in writing within one (1) week of TST reading.

II. Notification will include the following:

   A. Name of facility

   B. Date TST read (month/day/year)

   C. Result in millimeters of induration

   D. Interpretation of TST result

   E. Follow-up recommended, if appropriate

III. The following statements (or similar) regarding HCW risk factors will be included in the notification:

   A. HIV infection and other medical conditions may cause a tuberculin skin test to be negative even when TB infection is present.

   B. Persons with HIV infection and certain other medical conditions that may suppress the immune system are at significant risk of progressing to TB disease, if they have TB infection.

   C. If you have HIV infection or other medical conditions that may suppress the immune system, discuss your risk of TB disease with your primary care provider.

Procedure 13
Criteria for Health-Care Worker to Return to, or Start, Work after TB Disease Is Suspected or Confirmed

I. If the chest x-ray findings are consistent with TB disease, the health-care worker (HCW) will be referred for **immediate** medical evaluation and removed from the workplace or delayed in starting work until the following criteria have been met:

   A. The diagnosis of active TB disease has been ruled out by a medical evaluation, **or**

   B. Active TB disease is diagnosed, treatment is initiated, and the HCW is determined to be non-infectious by meeting all four (4) criteria below:

      1. Has had three consecutive negative AFB sputum smears on three different days, **and**

      2. Has completed at least two weeks of multi-drug anti-tuberculosis therapy, if AFB sputum smear was ever positive; or four days of multi-drug anti-tuberculosis therapy, if AFB sputum smear was always negative, **and**

      3. Exhibits clinical improvement, **and**

      4. Has continued close medical supervision.

II. A report will be made to the local health department as soon as TB disease is suspected or confirmed.

III. Post-exposure follow-up will be initiated, if appropriate.

References:

California Department of Health Services and California Tuberculosis Controllers Association. Joint guideline for placement or return of tuberculosis patients into high-risk housing, work, correctional, or in-patient settings. 4/11/97.

Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care facilities, 1994. *MMWR* 1994;43(No. RR-13).

Procedure 14
Analysis of Tuberculosis Screening Data

I. A paper or electronic database will be used to manage information collected from the TB screening program. This information will include the following:

   A. Demographic information for each health-care worker (HCW)

   B. Occupation (occupational group, job title), unit/area, and department for each HCW

   C. Required frequency of tuberculin skin test (TST) and/or TB symptom screening for each HCW

   D. TST data for each TST-negative HCW

      1. Date TST placed

      2. Date TST read

      3. TST result in millimeters (mm) of induration

   E. For each documented TST-positive HCW

      1. Date of change from negative to positive TST

      2. TST result in mm of induration

      3. Date of most recent TB symptom screening

II. Data analysis will include the following summary statistics, at a minimum, with time periods specified:

   Note: *To protect confidentiality of the HCW, no HCW will be identified by name on any report.*

   A. Annual rate of compliance with TST and TB symptom screening

      Note: *For ease of analysis, consider an HCW compliant if the individual has had a TST applied and read and/or TB symptom screening administered at least once during the year (even if more frequent TST or TB symptom screening was required and/or performed on the HCW).*

1. Tuberculin skin testing in periodic screening:

    a. The total number of HCWs required to receive TSTs (the *denominator* in 1.c. below)

    b. The total number of HCWs with TSTs applied and read (the *numerator* in 1.c. below and the *denominator* in B.4. below)

    c. Rate of HCWs' compliance with TSTs:

$$\frac{\text{Total \# of HCWs (except new hires) with TSTs applied and read}}{\text{Total \# of HCWs (except new hires) required to participate in TST}} \times 100$$

2. Periodic TB symptom screening of HCWs with history of prior positive TST:

    a. The total number of TST-positive HCWs required to participate in periodic TB symptom screening (the *denominator* in 2.c. below)

    b. The total number of TST-positive HCWs actually participating in periodic TB symptom screening (the *numerato*r in 2.c. below)

    c. Compliance rate of TST-positive HCWs with periodic symptom screening:

$$\frac{\text{Total \# of TST-positive HCWs (except new hires) who participated in periodic TB symptom screening}}{\text{Total \# of HCWs (except new hires) required to participate in periodic TB symptom screening}} \times 100$$

Note: *Evaluation of compliance rates at the facility-wide level may obscure significant differences in compliance rates between job categories, units, or types of screening (pre-placement, periodic, and post-exposure). For example, in a large facility, a 95% facility-wide compliance rate will not reveal poor compliance among specific occupational categories (e.g., radiology technicians, respiratory therapists), within the emergency department, or during post-exposure follow-up. On the other hand, in a small facility, a 95% compliance rate may be more meaningful. Therefore, if appropriate and feasible, or if problems with facility-wide compliance are suspected, compliance rates should be performed by unit, occupational group, and type of screening. Evaluation of compliance rates for screening required every three to six months may also be useful to identify poor compliance with more frequent screening.*

B. Number of HCWs with TB disease

C. TST conversions

1. Number of TST conversions in HCWs with documented *Mycobacterium tuberculosis (M. tb)* exposure

2. Number of TST conversions in HCWs with unknown/undocumented *M.tb* exposure

3. Total number of TST conversions in HCWs (the *numerator* in B.4. below, calculated by adding B.1. and B.2.)

4. TST conversion rate:

$$\frac{\text{Total \# of HCWs (except new hires) with newly positive TSTs}}{\text{Total \# of HCWs (except new hires) with TST applied and read}} \times 100$$

a. Information specific to TST conversion calculations:

1) For ease of analysis, assume that, on an annual basis, each HCW has received 1 TST (regardless of the number of TSTs the HCW received during the year) and has 1 opportunity to convert the TST. Use the result of the most recent TST to determine if a TST conversion has occurred.

2) TST conversion rate calculation (B.4. above)

a) Do not count any baseline TSTs on new hires in either the *numerator or denominator*.

b) Only HCWs who had a negative TST at the facility during the last year and have a TST conversion this year should be counted in the *numerator*.

c) Only HCWs who had a negative TST in the last year and who had TSTs applied and read this year should be counted in the *denominator*.

d) It should be noted that for the same 1-year period, the *denominator* of the conversion rate calculation is the same as the *numerator* of the TST compliance rate calculation.

3) The number of TST conversions and the conversion rate should be calculated for each occupational group, job title, and area/unit, as appropriate.

a) Evaluation of data at the facility-wide level only may obscure evidence of increased *M. tb* transmission in a particular occupational group, job title, or area/unit.

4) TST conversion data should be calculated at least annually. Annual TST conversion rates should be reviewed over several years (at least 5 years, if possible) in order to assess trends.

5) Since there is no national, standardized, comparable database against which to evaluate the facility's data, the facility must establish its own criteria for periodic comparison.

5. A data log of TST conversions will be developed and maintained for each area/unit, occupational group, or job title.

TB Screening Flowcharts

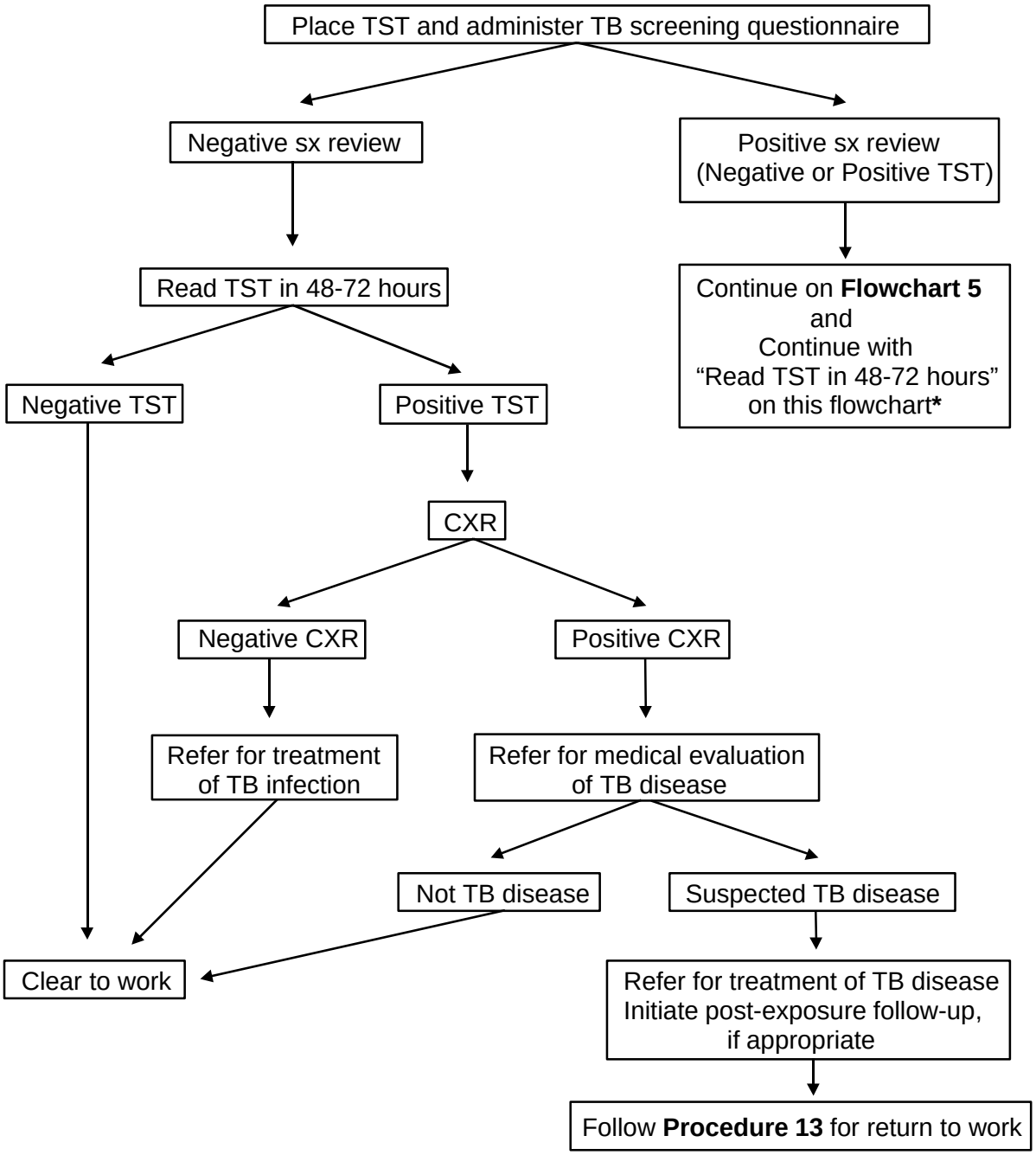
Abbreviations for TB Screening Flowcharts

CXR:	chest x-ray
HCWs:	health-care workers
Medical evaluation:	history, physical examination, and, if appropriate, bacteriology
Negative CXR:	no findings consistent with TB disease
Positive CXR:	findings consistent with TB disease
sx:	TB symptoms
TST:	tuberculin skin test

TB Screening Flowchart 1

Pre-Placement/Initial:
Last Tuberculin Skin Test Documented Negative < 12 Months Ago

(See Procedure 7a and 8)

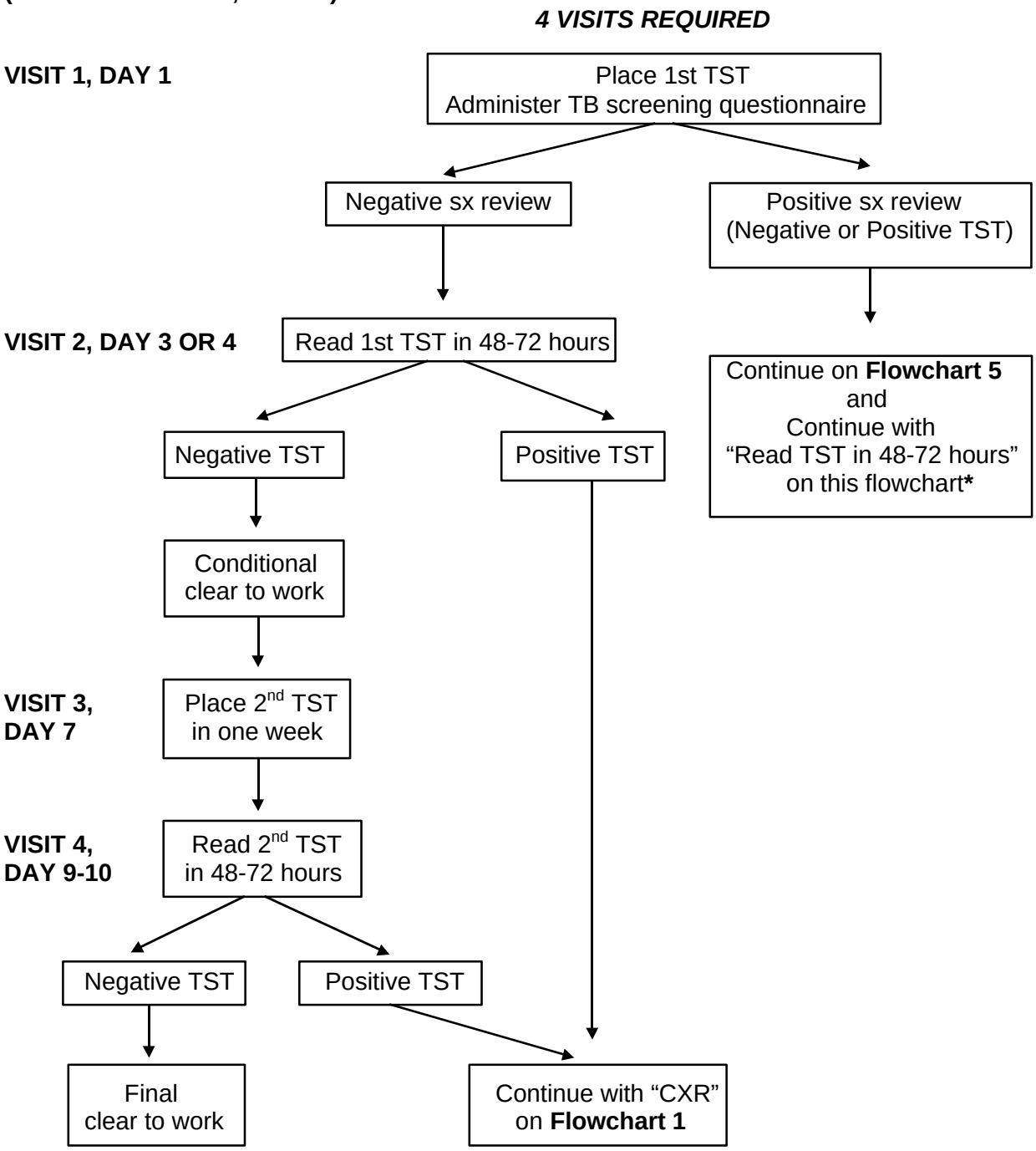


***** HCW should not be cleared to work until follow-up for positive TB symptom screen (see Flowchart 5) is completed.

TB Screening Flowchart 2

Pre-Placement/Initial: Schedule A
No Prior Tuberculin Skin Test (TST), No Documented TST, or Documented Negative TST ≥ 12 Months Ago

(See Procedures 7a, 8 and 9)

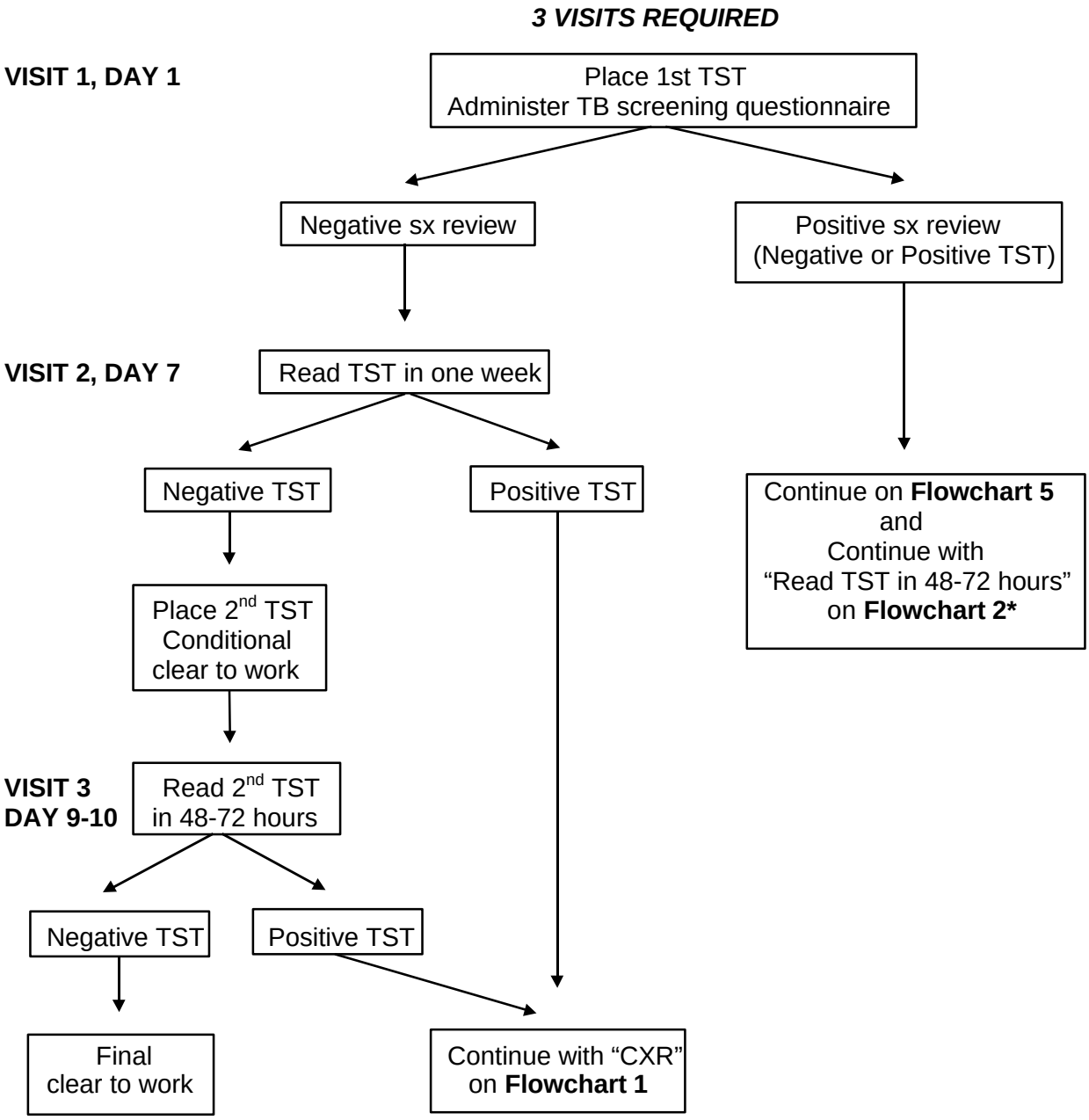


***** HCW should not be cleared to work until follow-up for positive TB symptom screen (see Flowchart 5) is completed.

TB Screening Flowchart 3

Pre-Placement/Initial: Schedule B
No Prior Tuberculin Skin Test (TST), No Documented TST, or Documented Negative TST ≥ 12 Months Ago

(See Procedures 7a, 8 and 9)

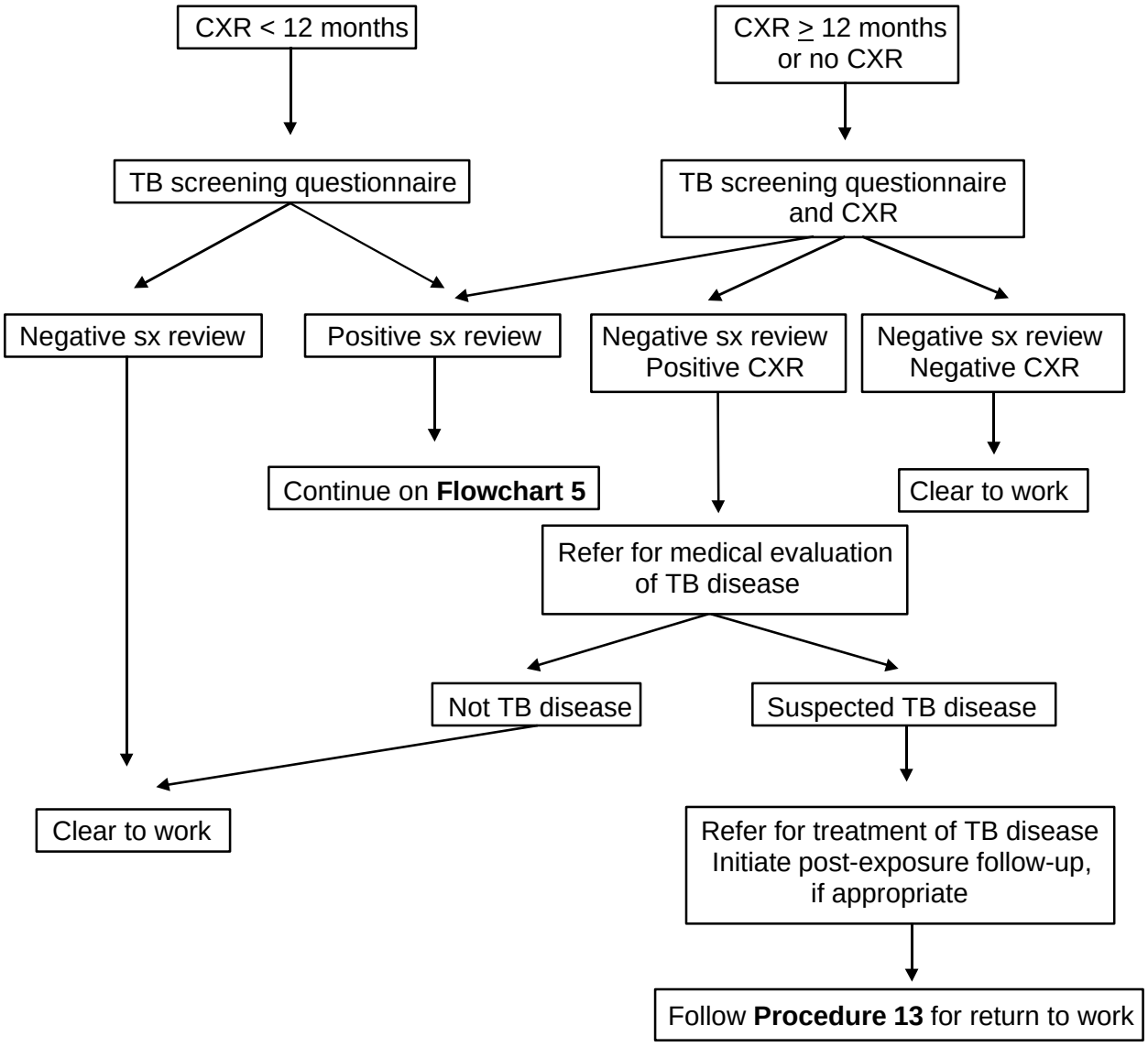


***** HCW should not be cleared to work until follow-up for positive TB symptom screen (see Flowchart 5) is completed.

TB Screening Flowchart 4

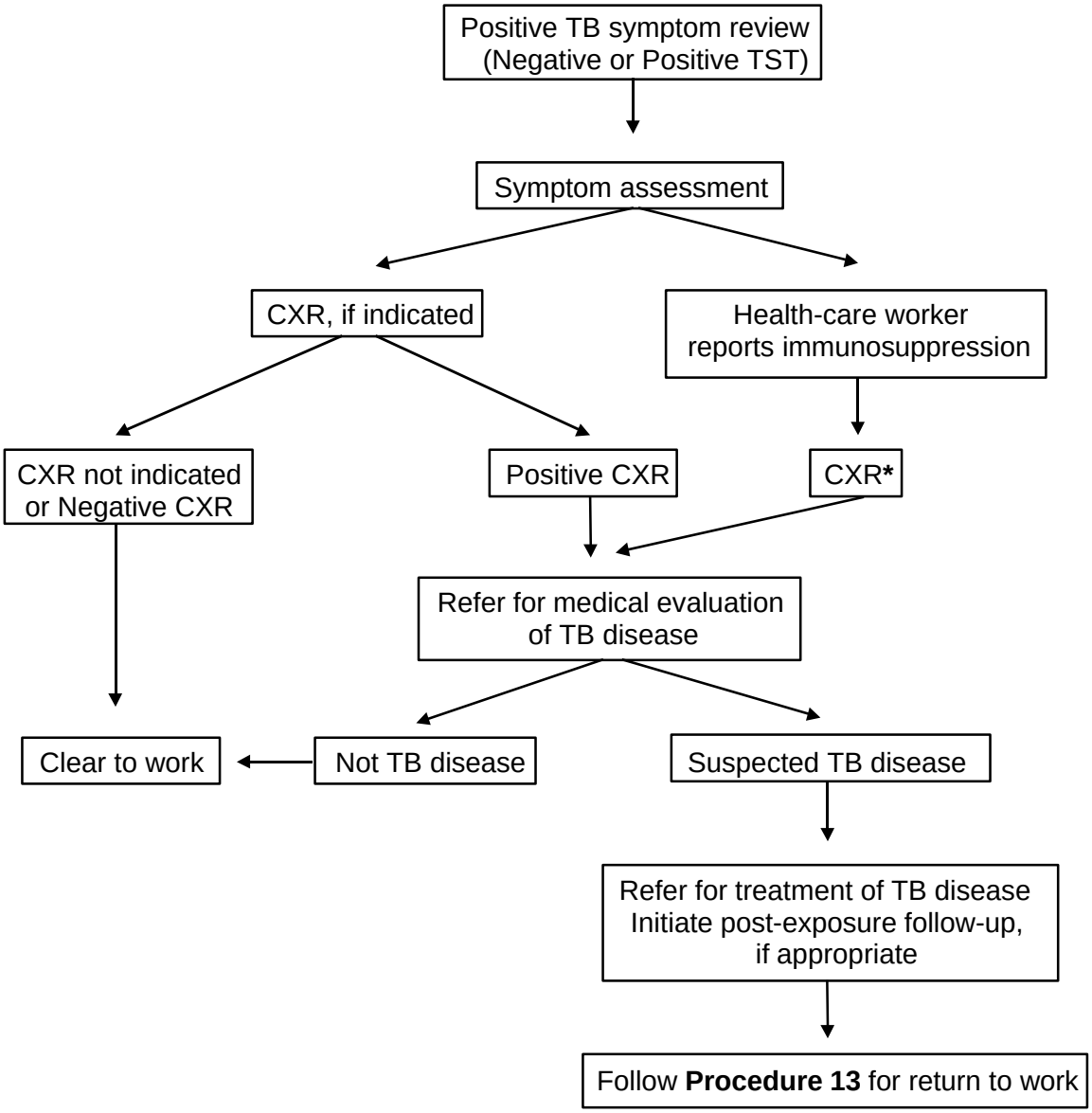
Pre-Placement/Initial: Documented Prior Positive Tuberculin Skin Test

(See Procedure 7a and 8)



TB Screening Flowchart 5
Follow-Up for Positive TB Symptom Screen

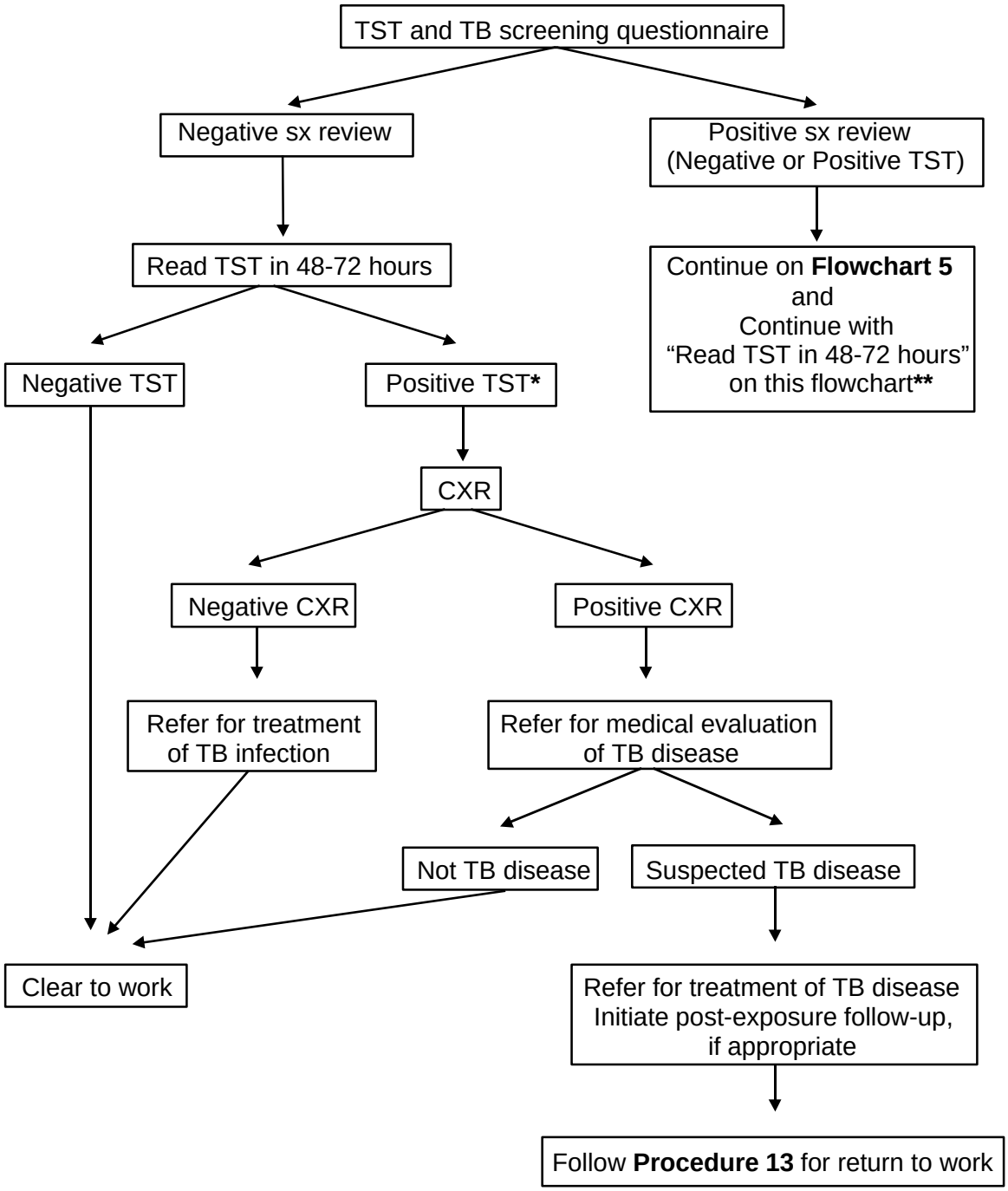
(See Procedure 8)



***** A medical evaluation will be obtained as soon as possible, regardless of CXR result.

TB Screening Flowchart 6
Periodic:
Negative on Last Tuberculin Skin Test

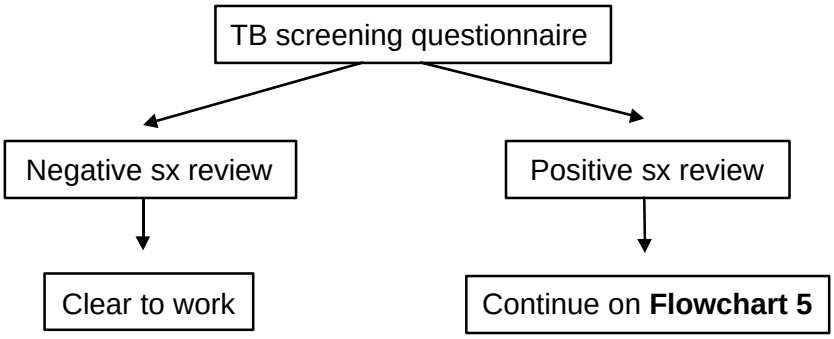
(See Procedure 8 and 10a)



***** If TST conversion, look for *Mycobacterium tuberculosis* source.
****** HCW should not be cleared to work until follow-up for positive TB symptom screen (see Flowchart 5) is completed.

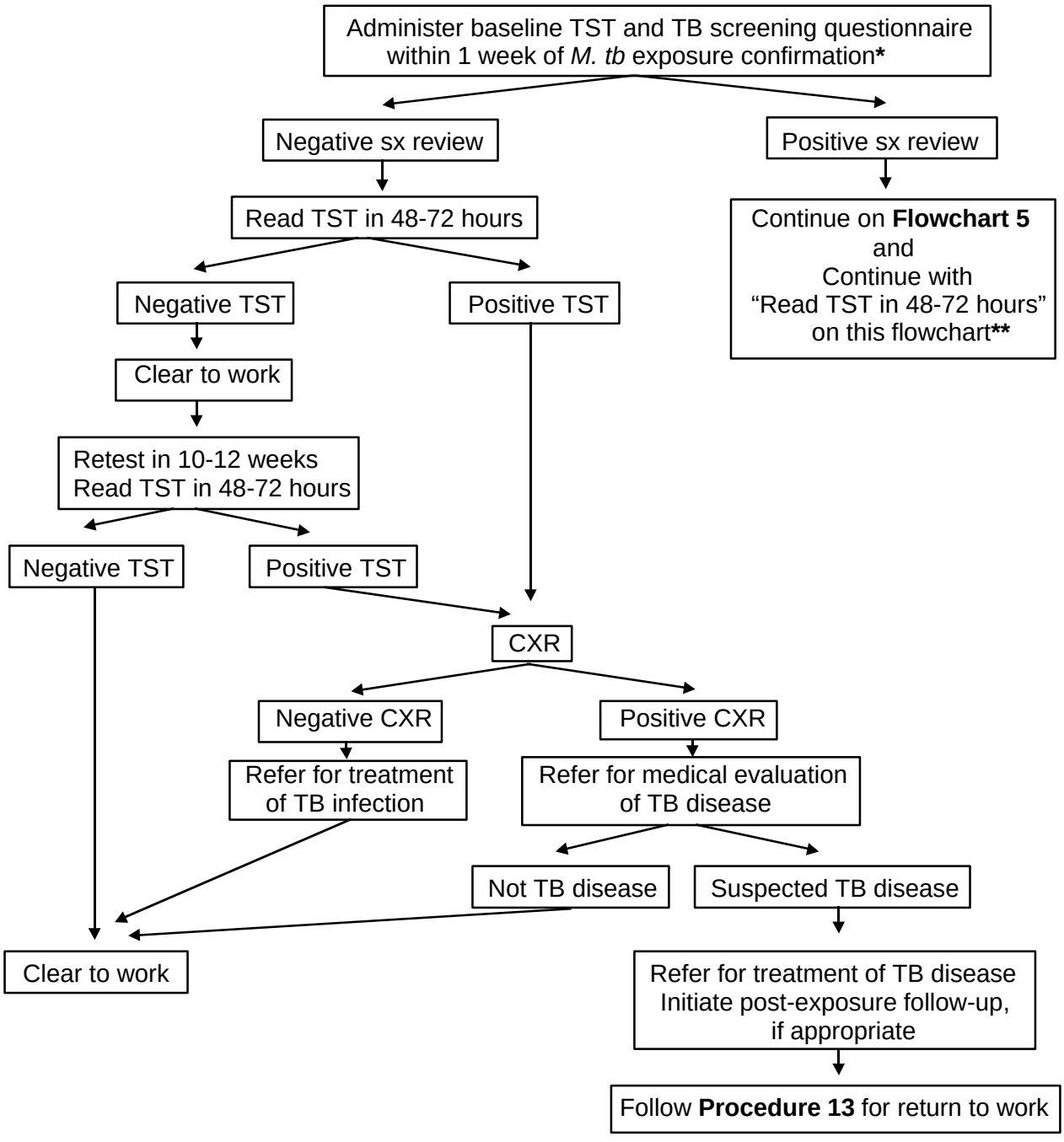
TB Screening Flowchart 7
Periodic:
Prior Positive Tuberculin Skin Test

(See Procedure 8 and 10a)



TB Screening Flowchart 8
Post-Exposure Follow-Up: Last Tuberculin Skin Test Negative

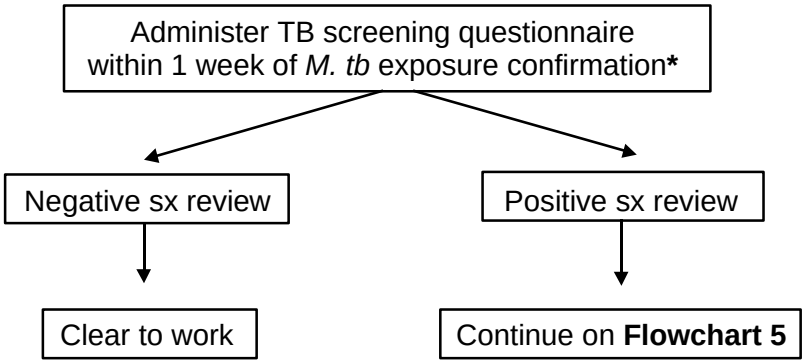
(See Procedure 8 and 11)



***** All immunocompromised HCW, with or without TB symptoms and regardless of TST results, will be referred for a CXR immediately.
****** HCW should not be cleared to work until follow-up for positive TB symptom screen (see Flowchart 5) is completed.

TB Screening Flowchart 9
Post-Exposure Follow-Up: Prior Positive Tuberculin Skin Test

(See Procedure 8 and 11)



***** All immunocompromised HCW, with or without TB symptoms and regardless of TST results, will be referred for a CXR immediately.

Appendix

Appendix A
Guidelines and Regulations

The following are examples of federal and state guidelines and regulations regarding TB screening in health care. ***[Review federal, state, and local guidelines and regulations appropriate to your setting (including licensure requirements). Insert the list of applicable guidelines and regulations from those below and from other sources into Section II of the policy.]***

Examples of Federal Guidelines and Regulations:

- Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care facilities,1994. *MMWR* 1994;43 (No. RR-13).
- Centers for Disease Control and Prevention. Screening for tuberculosis and tuberculosis infection in high-risk populations: recommendations of the Advisory Council for the Elimination of Tuberculosis. *MMWR* 1995;44 (No. RR-11).
- American Thoracic Society/Centers for Disease Control and Prevention. Diagnostic standards and classification of tuberculosis. *Am Rev Respir Dis* l990;142:725-735.
- OSHA. Enforcement Procedures and Scheduling for Occupational Exposure to Tuberculosis. 1996. CPL 2.106.
- Joint Commission on Accreditation of Healthcare Organizations. 1998 Hospital Accreditation Standard. Oakbrook Terrace, Illinois.

Examples of State Guidelines and Regulations:

- California Division of Occupational Safety and Health (Cal/OSHA). Interim Tuberculosis Control Enforcement Guidelines. 3/1/97. P&P C-47.
- California Code of Regulations. Title 22. Division 5. Volume 30. Licensing and Certification of Health Facilities, Home Health Agencies, Clinics and Referral Agencies.
- California Department of Health/California Tuberculosis Controllers Association. Joint guidelines for tuberculosis treatment and control in California. 4/97-11/98. Berkeley, CA.

Resources and References

The following is a list of resources and references that can provide further information about tuberculosis (TB) screening and *M. tb* exposure control, in addition to the broader topic of TB.

Resources:

Association of Occupational Health Professionals in Health Care
Telephone: (800) 362-4373
World Wide Web: http://www.aohp.org/aohp

Association of Professionals in Infection Control and Epidemiology, Inc.
Telephone: (202) 789-1890
World Wide Web: http://www.apic.org

California Tuberculosis Controllers Association
Telephone: (510) 883-6077
World Wide Web: http://www.ctca.org

Division of TB Elimination
Centers for Disease Control and Prevention
World Wide Web: http://www.cdc.gov/nchstp/tb

Francis J. Curry National Tuberculosis Center
Telephone: (415) 502-4600
World Wide Web: http://www.nationaltbcenter.edu

Occupational Health and Safety Administration
World Wide Web: http://www.osha.gov

References:

American Thoracic Society/Centers for Disease Control and Prevention. Treatment of tuberculosis and tuberculosis infection in adults and children. *Am J Respir Crit Care Med* 1994:149:1359-1374.

American Thoracic Society/Centers for Disease Control and Prevention. Diagnostic standards and classification of tuberculosis. *Am Rev Respir Dis* l990:142:725–735.

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